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Hon. Sean Conway, Minister
Bernard J. Shapiro, Deputy Minister

Handbook for Teachers of Students With Learning Disabilities

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Handbook for Teachers of Students With Learning Disabilities

1986

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Acknowledgements

This handbook is a major revision of the *Manual for Teachers of Students With Learning Disabilities* (1980) developed by Ian Dow, Robert O'Reilly, Margaret Hill, and Ann Dostaler of the Faculty of Education, University of Ottawa, under contract to the Ministry of Education, Ontario. The current writing team has replaced the perceptual-deficit / modality-preference model underpinning the Dow manual with a cognitive-language approach, added important new sections (e.g., on cognition and on learning strategies), and significantly expanded others (e.g., on language), using material from a variety of sources, including the 1980 publication *Children With Learning Disabilities* (the Curriculum Ideas for Teachers support document that this publication succeeds). Nonetheless, many of the teaching ideas and suggestions in this document were researched or developed by the Ottawa group, and the current writing team's indebtedness to Ian Dow and his team is readily acknowledged.

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Writing Team

Clive Hodder

Special Education Branch, Ministry of Education

Jim Waligun

Trillium School, Ministry of Education

Mary Willard

Trillium School, Ministry of Education

Contributors

Len Cooper, *University of Guelph*

Bill Dixon, *Dufferin County Board of Education*

Beverley Durrant, *Etobicoke Board of Education*

Janice Fine, *Scarborough Board of Education*

Paul Gauthier, *Halton Board of Education*

Marjorie Hill, *Etobicoke Board of Education*

Sue Irvine, *Waterloo County Board of Education*

Doreen Kronick, *York University*

Doug Laister, *Ministry of Education* (retired)

Donna Lee, *Scarborough Board of Education*

Peter Lindsay, *Ontario Institute for Studies in Education*

Mary Lloyd, *Hamilton Board of Education*

Tony Marini, *Ontario Institute for Studies in Education*

Edye McAfee, *Scarborough Board of Education*

Beth McDougall, *Hospital for Sick Children, Toronto*

Helen McKenzie, *Hospital for Sick Children, Toronto*

Delphine McKinnon, *Ministry of Education*

Eldon Pipher, *Ministry of Education* (retired)

Olive Pitson, *Scarborough Board of Education*

Barry Schneider, *Ottawa Child Study Centre*

Roberta Smith, *Scarborough Board of Education*

Pamela Sturgess, *Ontario Institute for Studies in Education*

Saara Tatem, *Etobicoke Board of Education*

Adele Thomas, *Brock University*

Pat Vance, *Toronto Board of Education*

Joan Vertes, *Hospital for Sick Children, Toronto*

Julianne West, *Scarborough Board of Education*

Marc Wilchesky, *York University*

Preface

Students with learning disabilities now constitute the largest single category of exceptional pupils in Ontario. Learning disabilities are, accordingly, among the most pressing problems challenging educators today. Without any rational order at the level of research and theory, it is often difficult for researchers to transmit any coherent system of knowledge to practitioners in the field. Thus, while teachers interested in increasing their understanding of learning disabilities have an abundance of literature to refer to, the divergent opinions offered in the literature are often difficult to reconcile with the immediate reality of a student within the classroom.

This handbook cannot claim to close the gap between educational theory and practice, but it does seek to present the current state of knowledge of learning disabilities as clearly as possible. Due regard, has, however, been given to important materials and approaches developed a number of years ago, since some of them still remain useful and since the purpose of this handbook is to provide, in an unbiased way, information, methods, and techniques that can assist the classroom teacher to provide more effectively for the student with learning disabilities. In revising this publication it should be noted that the writing team experienced considerable difficulty with the term *learning disabilities* itself, since it suggests a condition that is not amenable to change. On the other hand, *learning difficulty* does not capture the often prolonged resistiveness of a specific learning disability to amelioration. Since *learning disabilities* is a widely recognized term, its use is continued in this handbook. However, it should be interpreted in terms of severe learning difficulty, which, though resistive, is not unresponsive to change, provided appropriate teaching methods are used. Many of the instructional and management methods that are effective with students with learning disabilities are helpful to students with other exceptionalities. Teachers will accordingly find that this handbook provides information that is relevant to all types of learning difficulties.

The various sections of the handbook have been designed to be as self-contained as possible, since it is the intention of the writing team that this document be used as a resource or reference handbook. Teachers should be able to turn to the section of most interest to them and obtain useful information without necessarily going through the entire text. However, it is recommended that all teachers read the first two major sections of the document, since they contain ideas that underpin the entire handbook.

Teaching students with special needs is a highly significant and often challenging activity. However, the teaching of exceptional students, because it is important, *can* become a preoccupation of grim seriousness. This is to be avoided. When teachers lose their enjoyment in teaching, it is no fun for their students. The potential of students with learning disabilities has the greatest chance of being realized when teachers work together co-operatively on their behalf.

The theme of this handbook is that an integrated, multisensory approach in all areas can best assist learning-disabled students to become efficient learners. An effective instructional program will focus on building the student's self-concept by providing a supportive, caring, learning environment and by equipping each student with the skills to deal on equal terms with his or her world.

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Introduction

Who Are Students With Learning Disabilities?

The one outstanding characteristic of all students is their uniqueness. Thus, while any group of exceptional students shares similarities in terms of their special education needs and while it is possible to classify students on this basis, no student fits neatly into any one category. For example, mentally retarded students vary in their intellectual ability; hearing-impaired students have differing degrees of hearing loss; and, in the same way, blind, gifted, or physically handicapped students differ in their learning abilities and needs. Despite this fact, the common differences of most students with special needs are sufficiently marked to allow educators to specify certain criteria for each traditional category of exceptionality.

There are, however, many students who experience failure in school without satisfying the criteria of the traditional categories. Such students experience difficulties in dealing with various types of information, which may cause them to be disorganized, disoriented, uncooperative, socially awkward, accident-prone, slow to adapt to change, overly active or lethargic, and easily distracted. While these students are trying to achieve and have demonstrated abilities in some areas, they are not achieving in others. Their performance is uneven or inconsistent and they are often unable to profit from regular instruction. The term *learning disability* has evolved to encompass this group of students, although there is some recent evidence to suggest that three sub-types of this exceptionality exist, namely, **visual-spatial, language, and attention** disorders.

When students with learning disabilities have been thoroughly assessed, their social, emotional, cultural, or educational histories do not indicate specific learned behaviours, nor do they contain evidence of other handicapping conditions (e.g., vision or hearing impairment), although they

may indicate a proneness to allergies or a history of minor ailments (e.g., ear infections). Unlike students with visible handicaps, students with learning disabilities cannot be identified by any precise criteria (e.g., a numerical score such as IQ or decibel loss). Accordingly, estimates of the incidence of learning disabilities vary so widely that it can only be concluded that incidence is unknown.

This handbook takes the position that those children who may be considered to have some form of "classical" learning disability (i.e., a severe disability of presumed neurological origin) constitute a very small percentage of the population (i.e., up to 3 per cent). In a small number of cases these disabilities have resulted from some physical insult to the brain; others appear to have been transmitted genetically, since the disabilities seem to occur in preceding generations of the families to which the children belong. Another, larger number of students (up to 4 per cent of the population) exhibits similar or somewhat less pronounced characteristics.

Students in both of these groups exhibit difficulties that are often similar to the academic characteristics of children who are slow learners or behaviourally exceptional. Even though some of these students may not have a severe learning disability, they may be more at risk educationally than severely learning-disabled students because of lower levels of cognitive ability, motivation to learn, social and educational experiences, and parental support.

While interpretations of learning disabilities vary widely, learning-disabled students are generally considered to have inefficient strategies in the reception, storage, and production of information. They also experience a major difficulty in focusing attention. These difficulties are often most evident in children during schooling and may include social functioning. They affect one or more of the following: listening, reasoning, remembering, speaking, reading, written language, spelling, handwriting, mathematical

computations, problem solving, spatial relationships, and social interactions. While learning-disabled students can often handle the ideas in content areas, they may have difficulty handling intent or subtle meanings. Once the meaning is clear, they may be able to use the new information but may have difficulty in generalizing it to new contexts. In most cases, expression, either written or spoken, causes them great difficulty.

The following are some additional characteristics of students with learning disabilities:

- Learning-disabled students often behave in immature, narcissistic, and egocentric ways. This results largely because adults treat them as infants because they are different.
- They often find school a frightening experience. Peer-support groups can be of invaluable help to them in overcoming their fears.
- They may be able to master content but unable to produce answers. Thus, they may have comprehension skills but lack production skills.
- They sometimes become overwhelmed by the tasks they face. Although they are not natural problem solvers, they can learn through problem solving.

Identifying Learning-Disabled Students

Traditionally, two criteria have been mainly used to identify learning disabilities. The first, called the *exclusion factor*, involves an attempt to determine whether a student has a specific learning disability or whether his or her learning difficulties are related to some other condition (e.g., mental retardation, visual impairment, physical handicap, hearing impairment, emotional disturbance, inadequate instruction, or cultural difference). This requires that all aspects of the student's development (e.g., hearing or visual acuity, emotional factors, attendance patterns) be examined.

One problem with this approach is that the causes of learning difficulties are not always clear. For instance, some learning-disabled students exhibit the behavioural symptoms of extreme restlessness, impulsiveness, and distractibility, which often indicate emotional disturbance. However, these symptoms are also part of a learning disability that the American Psychiatric Association has labelled "attention deficit disorder (ADD) with or without hyperactivity".

The one commonality among learning-disabled students is a discrepancy between their ability and their achievement (e.g., a student with

above-average oral-language skills but serious deficiencies in his or her ability to write). This is called the *discrepancy component* and is the second criterion that has been traditionally used to identify students with learning disabilities. Discrepancy and the related notion of "scatter" in the student's profile are generally considered to be the most important differences between students with learning disabilities and those with other types of exceptionality. The poor learning ability of mentally handicapped students, for example, tends to be generalized, in contrast to learning-disabled students whose learning difficulties are often in specific areas.

If these two general criteria are satisfied, it is the teacher's responsibility to investigate further a student's learning difficulty and to determine how the instructional program may be modified to meet the needs of the student.

Programs for Learning-Disabled Students

There has been a tendency in the past to develop specialized and sometimes esoteric programs for learning-disabled students. The success of such methods as the following has given rise to controversy and has been challenged:

- work on the trampoline for older preschoolers who have significant difficulties with oral-language processing;
- the use of the Frostig-Horne materials and the Kephart-Getman techniques;
- the use of the Doman-Delacato program;
- the relationship between modality training and reading.

It appears that prefabricated programs designed to correct or alleviate learning disabilities are, at best, of only limited effectiveness. This is especially the case if they lack an integrated language or cognitive-training base.

In order to provide appropriate instruction for students with learning disabilities, teachers must have a thorough working knowledge of normal student development. They must know how most students normally acquire and use mental images or ideas and symbols, as well as how they communicate through gesture, movement, play, drawing, speech, and written language. Teachers should also be aware, as much as possible, of each student's experiences, interests, feelings, environmental background, developmental levels, strengths, needs, tolerance of new and

challenging situations, and adjustments to his or her world. Armed with such background knowledge and understanding, teachers of students with learning disabilities should be sensitive to:

- the way in which a task is presented, both in terms of teaching materials and instructional methods;
- the time needed by students to complete each task;
- the importance of adjusting curriculum tasks to suit the abilities and interests of the learner;
- the ways in which each student can best approach academic tasks; and
- the importance of success for each learner.

The following are some general needs of learning-disabled students and suggested strategies for dealing with these needs:

- Learning-disabled students need to be taught. Because they do not pick up information incidentally, they need very explicit, multisensory instruction. Such instruction should always be nudging these students forward. Time should not be wasted on ditto-sheet activities in which the student is merely repeating over and over again what he or she has already learned. Practice of this nature should only be provided when it is needed to master a skill or subskill.
- Students with learning disabilities need to acquire basic literacy. Because many of them have difficulty with reading, writing, spelling, and arithmetic, these skills should be taught through the use of a variety of carefully considered approaches and media.
- Learning-disabled students need structure and a great deal of direction in order to succeed in school. Because they have difficulty in structuring the information they receive through their senses, their teachers must provide them with structure and organization in the classroom. Since these students are often unable to predict events, they must be told ahead of time of what is coming.
- Learning-disabled students need to develop a positive self-concept. Teachers can only truly understand their students' behaviour and capacities by identifying deeply with the feelings of each student. In turn, students begin to acquire balance and self-possession by communicating and sharing their concerns and feelings.
- Students with learning disabilities need to be equipped with strategies and skills that will enable them to deal with the curriculum. In the long term they are hurt by a lowering

of standards or a watering down of the curriculum. Thus, these students can be greatly assisted by being taught how to approach and organize tasks. Sometimes termed *metacognitive strategies*, these skills in thinking about ways to understand, remember, and articulate content are particularly critical for secondary school students.

- Some students may be at a severe disadvantage with certain teachers. For instance, a student who processes language slowly will be lost with a teacher who speaks rapidly and is unwilling to modify his or her delivery.

Modality Preference and Learning Styles

Our growing understanding of the integrated nature of cognitive functioning suggests that attempting to identify a student's "strong modality" (visual, auditory, or kinesthetic / tactile) and to teach to that "strength" may not be appropriate. Modality preference may be more a function of how a student has been taught or has learned in the past than of how he or she learns most efficiently.

The labelling of students as visual or auditory learners may therefore be erroneous. People may call themselves visual learners because they find it difficult to retain and recall the information that they hear without visualizing it (e.g., telephone numbers). However, this indicates not that they are visual learners, but that they have selected a *visualization strategy* to retain and recall the information they hear. Similarly, people who consider themselves auditory learners because they repeat to themselves information that they have seen and wish to retain and recall are not auditory learners, but learners who have selected a *subvocalization strategy* to retain and recall information.

There is no conclusive evidence to justify the grouping of people into categories of auditory or visual learners on the basis of the strategies they employ. People tend to employ strategies with which they are familiar and that they find useful (e.g., association). This does not mean that they could not employ other strategies with equal proficiency. They may simply not have discovered or been taught other equally useful strategies.

Although people have varying capacities to remember the information they receive, most people will retain information that contains a strong affective component. Thus, for example, when significant events occur, most people will retain the details involved. However, if the information is less attention provoking (i.e., less

meaningful), only a small number of people may attend to it and make the effort to retain it. This indicates that memory is a function of attention.

Closely related to the concept of attention is that of focusing. Normal students are able to focus on a situation, filter out distracting or irrelevant details, and consider an appropriate course of action. Learning-disabled students are, almost by definition, impulsive. They act or react rather than attempt to think things out or reflect on the potential consequences of their actions or reactions before they perform them. Teachers can render these students a great service by equipping them with strategies to deal with confusing or difficult situations. Rather than immediately responding with "I can't do it," the learning-disabled student may then be able to explore alternative ways of dealing with the situation.

It is evident, then, that strategies may be employed in a variety of contexts and for different

purposes; to assume that visualization, subvocalization, or any other type of strategy is employed in isolation is to repeat the mistakes of the past. For instance, although people often think that they are employing a visualization strategy when they attempt to remember things by writing them down, they are in fact visualizing, performing the motor act of writing, and probably unconsciously subvocalizing all at the same time. In other words, all of the senses (except perhaps the olfactory) are being used simultaneously. Even the olfactory sense is not to be denied. Smell, like all other stimuli, can be a powerful aid to memory. It is simply one that is not usually employed in the classroom.

Humans tend to use a multisensory approach when they wish to understand and retain difficult information. Accordingly, this handbook advocates a multisensory, multifocal approach to student learning.

A faint, diagonal watermark across the page. It contains the text "FACULTY OF EDUCATION" in a large, serif font, and "UNIVERSITY OF TORONTO" in a smaller, sans-serif font below it.

Developmental Areas and Learning Disabilities

The characteristics of learning disabilities are usually discussed in terms of difficulties in the following developmental areas:

- motor and co-ordination
- perceptual-motor
- visual perception
- auditory perception
- language
- cognition
- social and personal factors

This section examines each of these areas. It should be noted, however, that any such discussion of specific areas necessarily tends to ignore their integrated nature.

Motor and Co-ordination

Motor difficulties are traditionally divided into two specific areas – gross motor and fine motor.

Gross-motor, or large-muscle, difficulties are generally manifested in a student's overall clumsiness. Although gross-motor problems make it difficult for the student to participate successfully in gymnastics and sports, they are not considered to be as great a problem academically as fine-motor difficulties.

The observation of students while they work and play is one of the best ways of assessing their motor abilities. Students with gross-motor difficulties usually exhibit some of the following characteristics:

- awkward or unusual walking patterns;
- a history of significantly delayed developmental milestones;
- poor balance or a general lack of co-ordination;
- weakness or poor endurance;

- an inadequate control of movements (as evidenced by either excessive floppiness or excessive rigidity);
- poor posture;
- an inadequate range of motion or flexibility.

Fine-motor difficulties are a much more controversial matter. Although this term is commonly accepted in the learning-disabilities field, *fine-motor difficulties per se are actually rare among the learning disabled*. Difficulties that are attributed to poor fine-motor skills may often be difficulties in paying attention to detail. In a pattern-copying exercise, for example, learning-disabled students can see the pattern and have the motor skills to reproduce it, but lack the analytic skills necessary to transform the perceived features into a fair copy. Such students do not have either a visual-discrimination problem or a fine-motor problem, but are simply confronted by more details than they can deal with. They need to be taught not how to hold a pencil or how to position their papers but how to look analytically, that is, to pay attention to details (or the right details) and to how these features fit together.

Because of poor analytic skills, students may have difficulties with printing and writing. They will have difficulty with colouring, cutting, and printing on and within lines. Consequently, their assigned work may not be completed, and what they produce will often be untidy and illegible. This becomes a serious problem as students progress into the higher grades, where more and more written work is expected and where notes and written examinations are required. Thus, poor analytic skills rather than fine-motor problems may be the cause of some of the following learning disabilities that students display:

- confusion while performing an unfamiliar sequence of skilled movements;
- lack of co-ordination between the two sides of the body;

- hypo- or hypersensitivity to visual, auditory, olfactory, or tactile input and a consequent increased need for, or withdrawal from, sensory input. Alternatively, an excessive need for fast movement activities may be exhibited;
- difficulty with spatial relations, body awareness, and right-left discrimination;
- attention difficulties;
- marked mood variation and a difficulty in adjusting to change.

Perceptual-Motor

Perceptual-motor ability has traditionally been viewed as the ability to provide the appropriate response to a visual or auditory stimulus, to match what one perceives with a consequent motor act. An example of problems in this area would be when a ten-year-old student is unable to judge the direction of the diagonals in attempting to copy a triangle and thus produces a disjointed or rectangular design. Problems also often occur in printing, a task that requires the student to perform the cognitive task of accurately matching the visual perception of letters with the motor act of printing them. Examples include problems of letter reversals (e.g., *b* for *d*), word reversals (e.g., *saw* for *was*), and problems of spatial judgement and co-ordination (e.g., *oi* for *a*).

An inability to perform tasks of this nature is viewed as evidence of perceptual-motor problems. However, basic to achieving this match is the individual's own body awareness, which is the point of reference for all other movements. As the term implies, body awareness is a cognitive function, and cognition is inextricably interrelated with language. As body awareness develops, so does the perception of direction and space. An individual who has poor body awareness experiences difficulty in acquiring language

concepts that represent dimensions related to the body (e.g., left-right, up-down, near-far, high-low, wide-narrow, big-little). Again, poor analytic skills, rather than perceptual problems, are the source of the individual's difficulties. The fact that students who reverse letters and words, for example, have nothing wrong with their vision (they see the stimuli normally), and that fine-motor problems are rare, strongly supports the analytic-skills hypothesis. Such students are hard pressed to learn curriculum content (e.g., language of mathematics, how to follow directions).

Visual Perception

It has been traditionally held that students who have problems in learning to read exhibit difficulties in three specific areas – visual discrimination, visual sequencing, and visual memory. Their visual-discrimination difficulties include distinguishing between *b* and *d*, *m* and *w*, *p* and *q*, *no* and *on*, *saw* and *was*, and so on. Their visual-sequencing difficulties involve an inability to remember the left-to-right order of letters in a word (e.g., *spot-stop*, *had-hda*, *who-hwo*, *girl-gril*, *least-laest*). The printing errors of these students have been considered further proof of their visual-discrimination and sequencing difficulties. A poor visual memory is thought to contribute to a student's discrimination, sequencing, reading, and spelling difficulties, because the student is unable to develop a constant visual image that can be retrieved accurately and at will. It has also been considered to contribute to the slow development of sight-reading vocabulary, delayed reading ability, and difficulties in mathematics (the student may not remember how to set up a problem or where to start).

These behaviours are not likely to be the result of perceptual or memory problems per se. Instead, they reflect higher-order cognitive and language-processing difficulties. Consequently, tools that focus on improving visual memory and visual discrimination are unlikely to be helpful to students suffering from visual-perception difficulties.

Auditory Perception

Certain children seem to have difficulty with what are termed *auditory-perceptual tasks* in school. These auditory-perceptual difficulties are seen in the areas of discrimination, sequencing, or memory. In the past it was thought that discrimination difficulties result in speech problems (e.g., the student says "hab" for "have" or "firsty" for "thirsty"). However, it is now believed that there is no causal link between the two. Students who have difficulty pronouncing or sequencing sounds when speaking are usually demonstrating a difficulty with the phonological component of the language system (see the next subsection on language). It has also traditionally been thought that students who have difficulty distinguishing spoken words in phonics tasks (e.g., *cap-cop, bend-bent, bet-bit, shop-chop, wish-with, picture-pitcher*) have auditory-discrimination difficulties. However, it is now believed that these students have not developed higher-level metalinguistic skills (see page 17), which appear to be related to the ability to blend sounds together in phonics tasks.

Auditory memory is the process of remembering what has been heard. In the past it was thought that students who have difficulty following instructions (e.g., "Clear off your desks, then take out your spelling books and turn to page 23") have an auditory-memory problem. However, difficulties in this area more likely reflect inefficient language-processing strategies. The next subsection, on language, provides examples of such difficulties.

In summary, auditory perception must be viewed within the context of language and cognitive processes.

Language

The close relationship between language and learning is no longer a source of debate. It is clear that language underlies the major portion of academic learning and that it is impossible to separate language from learning, reading from language, and language from cognition.

Today, language disorders are seen as being very complicated in nature. The language-disoriented student may manifest a wide range and variety of difficulties that defy easy labelling and categorization. Within the past decade research has expanded our image of language learning and emphasized that it is a dynamic and changing process. It has now been established that communicative competence encompasses more than concept knowledge and grammar. In other words, processing and producing language is viewed as an active process of hypothesis testing in which the language-competent student draws on past experience and semantic, syntactic, morphological, phonological, and non-verbal context cues. Furthermore, researchers have outlined the progression of strategies used by children as their comprehension skills begin to approximate an adult model. This information, in turn, has re-emphasized an important concept: that language development continues after the early Primary years. In fact, entirely new language skills begin to develop at this time (metalinguistic skills). As children enter school, they enter a new and major stage of language learning. For example, at approximately age five they begin to be able to deal with more abstract relationships. This allows them to process and use more sophisticated sentence structures, which may underpin such very important skills as learning to make inferences and using more efficient integration strategies.

Researchers and practitioners have begun to emphasize the continuity between oral and written language, stressing that they are different representations of the same underlying system. Reading must be viewed as a skill inseparable from the language skills that the reader does or does not possess. Reading and writing abilities are language-based processes involving language skills ranging from vocabulary development to metalinguistic abilities (e.g., sound-segmentation or auditory-analytic skills).

Just as teachers cannot assume that students enter school with an intact language system, they can no longer hold restricted views of language development. Unfortunately, much of our teaching content, methodology, and programmed materials place the language-impaired student at a serious disadvantage, as these require language competencies that the language-disabled student may not yet have developed. The challenge,

then, becomes one of ensuring a match between a student's language competency and the language demands of the curriculum and the classroom. This is especially true for students who have been diagnosed as language-learning-disabled.

Who is the language-learning-disabled student?

In many instances the learning-disabled student and the language-disabled student are one and the same, since the skills that many learning-disabled students have difficulty with are heavily dependent on language. For instance, it is now understood that the learning of sound-symbol correspondences and word-attack skills encompasses higher-level language skills rather than simple auditory discrimination and blending skills. Furthermore, the language-disabled student will present a different profile of symptoms at different stages of development. For instance, the student who at age ten interprets messages too "literally" will often have demonstrated more obvious language difficulties at age five. Similarly, many students who encounter difficulties with the acquisition of written language (reading and writing) also demonstrate, or demonstrated in the past, problems in the comprehension or production of oral language.

Teachers and specialists must view programming for language-disabled students as a process involving long-term assessment and intervention.

While students may master certain aspects of language with specialized teaching, they may nonetheless encounter problems as new and different demands are placed on language processing and production. In addition, the manifestations of language difficulties span the continuum from overt to subtle. At times, students are brought to the attention of language specialists for what seemingly appear to be problems separate from language (e.g., social, academic). It is often discovered, however, that the source of difficulty is language-based. Clearly, it is no longer possible to view

curriculum, content, and learning goals as separate from language. Language disorders may have a deleterious effect on students' acquisition of knowledge and skills in all subject areas and in their social-emotional development.

It is also no longer appropriate to view language as a set of separate and unrelated skills that need to be learned individually. Many strategies for teaching language in the past emphasized the strengthening of skills such as auditory discrimination and auditory memory, but it is now accepted that a delicate interplay exists between language and these factors. For example, how well we discriminate sounds is influenced by our familiarity with vocabulary and, in certain types of phonics tasks, by higher-level language skills (metalinguistic) involving sound segmentation.

Given the complexity of language and language disorders, it is inappropriate to utilize approaches that target causes and factors of a unidimensional nature. Language must be viewed as a system of integrated components. The interaction between language content, language form, and language use outlined below has been found to be a useful framework for describing who the language-disabled student may be, the nature of his or her difficulties, and how these difficulties cross modalities and tasks. In this manner, effort is focused on describing language behaviour rather than labelling it.

A framework for describing language

Content, form, and use. Language can be considered to include the interaction among three dimensions: language content, language form, and language use. Language content includes the meaning represented in a spoken or written message. It includes word meanings and meaning relations among words. This dimension is also referred to as the *semantic component* of language.

Language form includes the following three components:

- phonology, the sounds and sound sequences permitted in one's language (e.g., English phonological rules allow sound sequences such as / sub /; but do not permit / sbu /);
- morphology, the smallest unit of meaning in a language, ranging from root words to inflections that carry meaning (e.g., the word *shares* consists of two morphemes – the root *share* and the plural inflection *s*);

- syntax, the rules governing word order and permissible sentence types.

Language use addresses the functions of language in context and consists of the following:

- the reasons for, and function of, language behaviour (e.g., to seek information, relate information, comment);
- the manipulation of the forms of language to "fit" the situation, which can be non-linguistic (e.g., social parameters, physical setting) or linguistic (e.g., previous sentences uttered or written in a passage). Language use refers to the selection process whereby individuals choose from among alternative forms (how students learn to say what, to whom, and in what circumstances);
- conventional norms or principals governing conversation or discourse, including the following: rules or turn taking, making decisions about how much and what type of information is required (listener needs), monitoring discourse (whether spoken or written) to ensure that each succeeding sentence is relevant and appropriate (topic maintenance), and repairing communication breakdowns that may occur (speaker-listener roles).

Language-disordered students often have difficulty in distinguishing between the meaning carried by the words in a sentence and the intended meaning of a message. Consider, for example, the following three utterances:

- Neil, take your picture home with you today.
- Neil, is your picture in your school bag?
- Neil, I don't see your picture.

Although these three sentences are structurally different from one another, the intended or pragmatic meaning is the same. That is, the teacher wants Neil to take home his picture. Some language-disordered students may misinterpret the second and third sentences because their intended meaning is not directly stated. The first sentence would most likely be followed through correctly, as its syntactic, semantic, and pragmatic aspects are more closely aligned with one another. Thus, what a sentence suggests by its structural arrangement and what it means pragmatically may not be the same.

In addition to misinterpreting indirect statements such as those above, language-disordered students may not be adept at conforming to social

conventions as a result of their weak pragmatic language skills. For example, some language-impaired students may appear to be unaware of when a more diplomatic style of communication is called for. Such students often appear overly blunt or perhaps even rude. Educators and specialists must consider the effects that pragmatic problems may have on students' social skills.

Language growth during the school years

Several major advances in language development occur during the school years – developmental shifts that are critical to students' success with classroom curriculum and instruction. When children enter school, they have learned a great deal about language, but although they are quite adept at understanding and using language, their skills are generally more automatic than analytic. That is, most young students are not aware that they know as much about language as they do. They are just beginning to deal with language as an object that can be reflected on and discussed in and of itself. This can perhaps be best conceptualized as a distinction between implicit knowledge and explicit knowledge about language. When children enter school, they bring with them the language of their daily life. In contrast, when in school they must use language in more complex contexts. This language of learning is conscious and explicit and requires higher-level, and more abstract, language skills.

The following are some of the new and different aspects of language that students develop facility with during the school years and that have important implications for academic success:

Vocabulary and concept knowledge (content and form). By the age of seven or eight, most children have made what is called the "syntagmatic / paradigmatic shift". Many learning-disabled students fail to make the shift to paradigmatic responses until much later than expected.

Syntagmatic (syntax-based) responses reflect a concrete level of vocabulary organization. Students tend to categorize word concepts together based on their personal experiential associations (e.g., cat-meows; cat-furry; run-fast). When explaining how two target words are alike, they

often provide answers that indicate concrete verbal-reasoning skills. For example, when asked to explain the similarity between a clock and a watch, students might give answers like: "They both are round," "They both tick," "They both have numbers." These students have focused on perceptual features rather than more abstract relationships (e.g., both tell time).

Paradigmatic (concept-based) responses reflect a more abstract level of vocabulary organization than do syntagmatic responses. Students understand that words can fit together in higher-order categories (e.g., cat-dog, cat-animal, run-walk) and usually possess more abstract verbal-reasoning skills. For example, when asked to explain the similarity between a clock and a watch, students are likely to answer: "They both tell time."

Syntax development (form). During their school years students gain proficiency in understanding complex grammatical constructions. For example, in the comprehension of adverbial clauses, younger students respond correctly more often when the order in which the clauses are heard or read coincides with the order in which they actually occur. For example, "Do your math before you do your phonics" is easier to understand than "Before you do your phonics, do your math."

By the time they reach the Junior level, most children have learned that the order of words and clauses does not necessarily lead to the meaning of the message, and they have learned the cues that signal this. However, this is often not the case with learning-disabled children.

Another example of the implications that syntactic skills can have on curricular success is the subtleties of pronoun usage. A sentence like the following exemplifies the progression that Primary students proceed through: "Pattie knew that *she* would do well on the exam." In order to interpret this sentence correctly, the students must know that "she" could refer to "Pattie" or might refer to someone else. Some studies have shown that children under the age of five-and-a-half years assume that the pronoun and the noun always refer to the same person. This is also true of students whose language development is delayed, including some at the Junior high school level. Thus, these students may encounter difficulty when attempting to interpret stories that they read or listen to, since even basal readers are heavily laden with pronouns.

Inference abilities and integration skills (use). A student's ability to understand how ideas relate to each other from sentence to sentence, passage to passage, or even between stories, changes and develops during the school years. In particular, students increase their facility in drawing inferences and integrating ideas. This is an excellent example of their growing ability to process information that has not been explicitly stated, as they must draw on prior knowledge and contextual information to arrive at correct conclusions.

Communicative competence (use). Through-out the school years students become increasingly sophisticated and flexible in manipulating language in social situations. This appears to be a problem area for language-learning-disabled students, however. For instance, some learning-disabled students' use of language reflects difficulties in their ability to read the situation, interpret the needs of their listeners, and repair communication breakdowns.

Literate language (use). Students also become increasingly exposed to the language of stories and story telling, which requires a knowledge of certain facets of language that do not come into play in the course of daily conversation. However, literate language is not restricted to written language (reading and writing). At times, a speaker uses a literate style of language, as in the case of oral story telling or presenting an oral book report.

When using a literate form of language, speakers or writers must take care to attend to certain features of language that may not concern them in ordinary conversational interactions. In ordinary conversation a fair amount of information is transmitted through stress, gestures, and intonation; speakers and listeners can backtrack and clarify information when the need arises; and speakers and listeners share a common point of reference both temporally and spatially. However, such features are absent in literate language, which must therefore be constructed somewhat differently in order to convey this type of information. For example, a sentence like "The three ladies were playing golf but it was the eldest one that got the hole in one" represents a literate form of language. If this were stated in the context of a conversation, however, one of the participants could communicate the same idea by saying: "Hey, look! She got a hole in one." What is apparent is that in literate language one must refer to things in a more explicit and detailed manner than would be required in oral conversation. When students enter school, they gradually become more proficient with literate language, which in turn is important to their academic success.

Metalinguistic skills (content, form, and use). An important aspect of language learning that shows considerable development over the school years is the students' growing ability to analyse and reflect on language itself. This is referred to as the development of language awareness, or metalinguistics.

There is a growing body of research suggesting an important relationship between metalinguistic abilities and reading acquisition. To understand the relationship between speech and print (sound-symbol aspects of decoding), it is believed that students must first be aware that the spoken word can be segmented into its component sounds. This awareness of the sound structure within the spoken word is a metalinguistic skill that is found to be weak in many language-learning-disabled students. For example, auditory-discrimination and sound-blending activities comprise a major portion of a student's program in phonics. A student who is not successful at these activities may be demonstrating weak metalinguistic skills rather than auditory-perceptual or visual-perceptual problems, since these tasks require the manipulation of sounds or sound segmentation.

Metalinguistic abilities also play an important role in learning to appreciate and use such linguistic nuances as jokes, riddles, puns, and figurative language (metaphors, idioms, etc.). These aspects of language are both academically and socially important, particularly as students move into the upper grades. Developing a proficiency with this type of language appears to be a problem for many language-disabled students.

A framework for evaluating language functioning

Tables 1 and 2 summarize areas of language ability and areas of difficulties. Table 1 considers various aspects of language ability that teachers should examine when attempting to understand the nature of a student's learning disability. Table 2 provides examples of how a student's learning difficulties may be manifested within these areas. Although the language areas have been divided into sections within the charts, it is important to remember that the different areas overlap one another.

Table 1 Areas of Language Functioning

	Oral	Written
Processing (content, form, use)	<p>A. Word Level</p> <p>Understanding the meanings of single words:</p> <ul style="list-style-type: none">- concept knowledge- prefixes and suffixes, tense endings, etc.- higher-level (metalinguistic) aspects, i.e., synonyms, antonyms, homonyms, double-function words <p>B. Sentence Level</p> <ul style="list-style-type: none">- Understanding the meaning of single sentences: syntax and morphology (i.e., word order) <p>C. Beyond Words and Sentences</p> <p>Comprehension of paragraphs, passages, and stories:</p> <ul style="list-style-type: none">- integrating information across sentences- making inferences- reading the situation- considering listener needs- going beyond literal meanings, i.e., idioms, sarcasm, linguistic humour, metaphors (metalinguistic)	<p>A. Word Level</p> <ol style="list-style-type: none">1. Decoding aspects<ul style="list-style-type: none">- sight words- phonetic decoding; special auditory factors (i.e., sound-segmentation skills)- automaticity and fluency- syllabication and morphographic aspects2. Comprehension aspects<ul style="list-style-type: none">- vocabulary comprehension <p>B. Sentence Level</p> <ol style="list-style-type: none">1. Decoding aspects and context clues<ul style="list-style-type: none">- semantic- syntactic- phonological (first letters / sounds)2. Comprehension aspects – Literal aspects, i.e., figuring out the who, what, and whom (same as oral processing – sentence level) <p>C. Beyond Words and Sentences</p> <ol style="list-style-type: none">1. Comprehension of paragraphs, passages, and stories<ul style="list-style-type: none">- integrating information across sentences- making inferences- reading the situation- considering listener needs- going beyond literal meanings, i.e., idioms, sarcasm, linguistic humour, metaphors (metalinguistic)2. Sense of story structure

Areas of Language Functioning (cont'd.)

	Oral	Written
Production (content, form, use)	<p>A. Word Level</p> <ol style="list-style-type: none"> 1. Articulation (phonology) 2. Word-finding ability 3. Suffixes and prefixes <p>B. Sentence Level – Grammar Structures (word order)</p> <p>C. Beyond Words and Sentences</p> <ol style="list-style-type: none"> 1. Conversation (social use of language) <ul style="list-style-type: none"> – turn-taking – adapting language to meet listener needs – topic maintenance – repairing communication breakdowns – body language 2. Oral story telling 3. Using language to reason, explain, solve problems, hypothesize 	<p>A. Word Level</p> <ol style="list-style-type: none"> 1. Spelling <ul style="list-style-type: none"> – auditory-analytic skills (sound-symbol aspects) – specific non-phonetic aspects – developmental stages 2. Vocabulary usage <p>B. Sentence Level – Grammatical Structure</p> <p>C. Beyond Words and Sentences</p> <ol style="list-style-type: none"> 1. Paragraph or story organization (introduction, conclusions, etc.) <ul style="list-style-type: none"> – techniques for tying sentences together, e.g., pronoun usage – providing sufficient information – author – reader contract, i.e., writing for an audience (overlaps with all other aspects) – purpose for writing, e.g., essay vs. letter – topic maintenance 2. Special literacy devices that reflect non-linguistic aspects of speech, i.e., periods, commas, quotation marks, exclamation marks

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Table 2 Examples of Students' Language Difficulties

	Oral	Written
Processing (content, form, use)	<p>A. Word Level</p> <p>The student:</p> <ul style="list-style-type: none">- has a restricted vocabulary repertoire (nouns, verbs, adjectives, etc., as well as specific concepts related to time, space, etc.) and word associations are personally or experientially based rather than conceptually (categorically) based;- lacks flexibility in choosing words;- has a limited awareness of abstract vocabulary aspects (i.e., has difficulty with homonyms and double-function words);- has a weak comprehension of prefixes and suffixes;- has difficulty with sound-play activities such as rhyming (metalinguistic). <p>B. Sentence Level</p> <p>The student:</p> <ul style="list-style-type: none">- misinterprets literate information (i.e., confuses who did what to whom);- cannot follow directions (i.e., confuses the order in which events took place, etc.);- does not understand conjunctions (<i>because, although</i>, etc.). <p>C. Beyond Words and Sentences</p> <p>The student:</p> <ul style="list-style-type: none">- does not make appropriate inferences;- is weak at drawing conclusions and evaluating information;- confuses and has difficulty recalling facts and details;- has difficulty abstracting main ideas and themes;- interprets language too literally;- appears "off-target" in comprehension;- misses the point;- has a weak appreciation of humour;- has difficulties in interpreting metaphors and other figurative language (metalinguistic).	<p>A. Word Level</p> <p>1. Decoding aspects</p> <p>The student:</p> <ul style="list-style-type: none">- has a weak awareness of the speech-reading relationship (sound-symbol aspects);- has difficulty learning sight words through a whole-word approach;- has not developed automaticity at decoding single words;- does not know or use strategies (i.e., syllabication to aid in word identification);- is much better at listening comprehension than at reading comprehension. <p>2. Comprehension aspects</p> <p>The student has weak vocabulary comprehension.</p> <p>B. Sentence Level</p> <p>1. Decoding aspects</p> <p>The student:</p> <ul style="list-style-type: none">- does not utilize context clues to anticipate or predict upcoming words;- does not use context to figure out the meaning of unfamiliar words;- reads aloud without expression (word by word). <p>C. Beyond Words and Sentences</p> <p>The student:</p> <ul style="list-style-type: none">- is unaware of and / or does not know what to do when a breakdown in communication occurs;- does not read for meaning;- approaches different reading situations in the same way;- has difficulty figuring out what pronouns refer to.

Examples of Students' Language Difficulties (cont'd.)

	Oral	Written
Production (content, form, use)	<p>A. Word Level</p> <p>The student:</p> <ul style="list-style-type: none"> - has reduced intelligibility; - has limited expressive vocabulary; - has word-finding difficulties (i.e., has long pauses or false starts, uses vague fillers, etc.); - does not mark tense, plurality, etc. <p>B. Sentence Level</p> <p>The student uses poor grammar (not slang).</p> <p>C. Beyond Words and Sentences</p> <ol style="list-style-type: none"> 1. Conversation <p>The student:</p> <ul style="list-style-type: none"> - keeps the "floor" too long or not long enough; - begins conversation at an inappropriate point; - switches topics rapidly and abruptly; - makes off-topic or tangential contributions; - appears to be unaware when the listener has not understood; - does not seek clarifications when necessary to do so; - provides insufficient information for the listener. <ol style="list-style-type: none"> 2. Oral story telling <p>The student:</p> <ul style="list-style-type: none"> - does not know how to tell a story; - tells a story that is loosely organized; - restricts stories to facts with no embellishment; - relies on vague or non-specific vocabulary, making it difficult to follow; - produces a story that lacks a theme or plot. <ol style="list-style-type: none"> 3. Using language to reason, explain, solve problems, hypothesize. <p>The student has difficulty formulating clear reasons, explanations, etc.</p>	<p>A. Word Level</p> <ol style="list-style-type: none"> 1. Weak spelling skills <p>The student:</p> <ul style="list-style-type: none"> - makes phonetically based errors; - has difficulty with non-phonetic words; - produces misspellings that do not resemble the targets in any way; - has not firmly established spelling rules. <ol style="list-style-type: none"> 2. Vocabulary usage <p>The student:</p> <ul style="list-style-type: none"> - does not have an extensive vocabulary with which to express ideas; - omits or incorrectly uses word endings (i.e., tense, plurality). <p>B. Sentence Level</p> <p>The student produces incomplete or poorly constructed sentences.</p> <p>C. Beyond Words and Sentences</p> <ol style="list-style-type: none"> 1. Paragraph or story organization <p>The student:</p> <ul style="list-style-type: none"> - writes in a poorly organized fashion; - presents ideas in a disjointed fashion; - goes off topic; - does not address the central issues; - writes stories with an underdeveloped theme or plot; - has little awareness of the hypothetical reader; - does not monitor or proofread his or her work. <ol style="list-style-type: none"> 2. Special literacy devices <p>The student has weak punctuation skills.</p>

Cognition

Cognitive development refers to the growth in a person's ability to acquire, interpret, organize, store, retrieve, and employ concepts and knowledge. Students with learning disabilities have gaps of varying severity in their cognitive development. Many of them do not appear to learn higher-level concepts incidentally. They need to be taught how to think, plan, classify, solve problems, understand abstract language, and generalize or transfer learning to new situations.

This subsection therefore includes the following:

- background information on cognitive training;
- some suggestions on how teachers can increase their own awareness and understanding of the learning process; and
- a variety of programs that can be used to *actively* teach thinking skills and strategies.

Further information on cognitive training at the secondary school level is provided in the last section of this document.

Cognitive training

Cognitive training refers to the explicit teaching of thinking skills and problem-solving strategies. Its goal is to modify inefficient thinking processes and to help students develop more adaptive problem-solving strategies, thereby facilitating all learning and real-life problem solving.

Practitioners have long been aware, and recent research has confirmed, that students with learning disabilities fail to use appropriate thinking strategies. However, this condition is reversible. Learning-disabled students can be taught to use active, deliberate cognitive processes to help them deal with both academic and social situations.

Metacognition is the term most often used in reference to making students consciously aware of their own thinking processes. It may be defined as the monitoring, regulation, and orchestration of one's own cognitive processes and products. It is the conscious, active direction of one's thought processes to achieve some goal or objective, including the ability to deliberately store, retrieve (memorize), and update (integrate) selected information for later use.

Cognitive training approaches

A program of instruction in thinking skills derived from observations and assumptions based on experience and common sense is described in

The Teacher Is the Key by Ken Weber. This program is based on the following principles:

- Students must understand that cognitive strategies are vital to their progress.
- Every student has the potential for effective thinking; this potential must be awakened, organized, and applied.
- Maintenance learning is important, but insufficient in itself. Sound thinking strategies are applicable in all areas.
- Instruction in efficient thinking strategies must begin with specific “thinking” material. When students experience success in this material they will apply what they have learned to the standard curriculum and beyond (generalization and transfer).

Weber’s training program is centred on two main cognitive processes:

- divergent thinking (usually encouraged in gifted students);
- reasoning and deductive thinking.

Because the latter is too global for students to grasp holistically, Weber suggests that the following components be dealt with in isolation until their use is established. A teaching sequence, with suggested materials, is given for each of them:

- attending to detail (e.g., following instructions, checking off items in sequence);
- establishing and testing hypotheses (i.e., assuming a piece of information and determining the consequences);
- identifying starting points (i.e., examining a task to find a beginning point);
- forward planning (i.e., thinking several steps ahead);
- reasoning and deducing, which are a culmination of the preceding five strategies, but go beyond them, involving the management of interrelationships among pieces of information.

Divergent thinking differs from the strategies described above, but is of no less importance. Logical thinking strategies narrow the focus, while divergent thinking widens the perspectives. Logical thinking organizes and manages ideas; divergent thinking provides the ideas. Each type of thinking is essential to the other.

In Weber’s view, brainstorming has proven to be the best way to develop the cognitive flexibility and the awareness of alternatives, new relationships, and interpretations that are found in divergent thinking. He provides guidelines for productive brainstorming in his book.

In *Instrumental Enrichment*, Reuven Feuerstein identifies specific cognitive deficiencies, which he states can be directly overcome by using his cognitive training program. Many of the following characteristics exhibited by learning-disabled students are similar to Feuerstein's "cognitive deficiencies".

- **Confused perception.** To perceive the world around us clearly, we use our senses (listening, seeing, smelling, tasting, and touching) to gather clear and complete information. Students who exhibit confused perception often perceive things only in a blurred, sweeping fashion, failing to focus on the details and subtleties of a situation.
- **Inadequate or poorly developed problem-solving skills.** Students with learning disabilities often exhibit impulsive, unplanned, unsystematic approaches to problem solving. Frequently they exhibit a lack of goal orientation, making little or no attempt to define the problem to be solved.
- **Impaired verbal skills.** Frequently students with learning disabilities lack the proper terminology to designate an object, sequence, relationship, or concept. Instead they may substitute special intonations, mimicry, or gestures. The lack of verbal coding skills makes the understanding of complex relationships more difficult and inhibits the understanding of the more abstract components of communication.
- **Spatial relationships.** Students with learning disabilities may have an inadequately developed sense of directionality and sequencing. Directionality is an awareness of left and right so that a sense of direction may be established. Sequencing is the ability to place things or events in an order according to a particular pattern. Inadequately developed orientation to space and time reduces the complexity of an individual's thinking to that of the simple identification of objects or events, without permitting the establishment of relationships among them. This is frequently apparent when learning-disabled students attempt to give directions to others. Frequently they are dependent on their own position as a reference point rather than using terms like *left* and *right*, *before* and *after*. Their terms are vaguely defined, if they are mentioned at all. They may have such difficulty in conceptualizing the pertinent spatial relationships that they will suggest physically guiding another person to a designated location and thus circumvent the problem of describing how to get there.

- **Perceptual instability.** Perceptual stability depends on the student's ability to retain the constant characteristics of an object or an event, in spite of the fact that changes in some of the attributes may take place. For example, a square placed on an angle may be considered to be a diamond shape. In such a case the student may not understand the original concept of a square. He or she may be unable to accept common factors as constant when a shift in orientation takes place.

- **The need to be precise.** Learning-disabled students may be satisfied with an approximation: they may not take the time to gather all the information needed, or some of the information may be distorted. The difficulty is that the need to be precise has not been developed in the early years. One of the most important factors in developing the need for precision is the feedback students receive on the efficiency of their communications to others. In childhood, the need for precision depends on explicit instruction, but in later years, as the need develops into habit, it is manifested as an internalized intrinsic need.

- **Impulsive behaviour.** Students with learning disabilities may exhibit impulsive, unplanned behaviour that is not the result of an inability to attend but of inadequate training in systematic problem-solving skills. Many incomplete or inadequate responses from students in the classroom are also the result of incompletely perceived instructions.

Teachers can deal with these problems by including in the tasks both an *explicit* and an *implicit* need to gather all the existing information, by introducing and emphasizing reflective thinking, by involving students in the planning process, and by providing adequate feedback.

- **Lack of interiorization.** Interiorization involves having a good picture in our minds of what we are looking for or what we must do. Frequently, students who have difficulty in this area place strong reliance on concrete perceptual cues. The generalizations that they make may be inappropriate because of a low level of abstraction.

- **Planning skills.** Students with learning disabilities may not have developed the ability to make a plan that includes the steps needed to reach a goal. Planning involves the following:

- setting goals;
- developing the means necessary to achieve the goals;

- c) judging the steps needed to reach the goals in terms of their suitability, feasibility, economy, and other criteria;
- d) planning steps in terms of their temporal sequence.

Planning is usually first learned in relation to short-term goals before it is applied to long-term objectives. Adults often discourage the need for planning by making decisions for young people, by telling them what to do, by not encouraging risk taking, and by not letting them experience the consequences of their own behaviour. An inability to organize or plan often becomes apparent when a student repeatedly comes to class unprepared or does not know how to set up a program of independent study.

- Passive attitude towards learning.

Students with learning disabilities may fail to see themselves as sources and generators of information. They may perceive education as something that is "done to them", rather than something in which they can become involved and make happen themselves.

- Internalizing relationships. Establishing relationships between objects and experiences and between the experiences of others and our own experiences involves the process of comparison – searching for the similarities and differences between situations. This spontaneous comparative behaviour is the primary condition necessary for establishing relationships. It involves the organization and integration of discrete units of information into co-ordinated thought. Feuerstein considers this to be one of the most fundamental building blocks of the higher cognitive processes, for without spontaneous comparative behaviour the individual is unable to make the logical inferences that lead to abstract, propositional, and hypothetical thinking.

- Lack of hypothetical thinking. Hypothetical thinking involves thinking about different possibilities and considering what might happen if one were chosen rather than the other. Learning-disabled students tend to act without thinking about the consequences of their actions. Thus, hypothetical thinking is something that must be *explicitly* modelled for them and that they should be encouraged to engage in.

- Logical thinking. There is a tendency in some students to accept things as they are. They do not consider logical consistency to be

essential. These students may not be disturbed by an illogical relationship or by the lack of logic in their own responses. Feuerstein does not feel that the lack of need for logical evidence reflects a low level of intelligence. He suggests that this reflects a faulty need system in which logical evidence is neither prominent nor pertinent. Accordingly, to the inferential question "Why?" the student will often just respond "Because." When further pressed, the student will often say, "It just is." In other words, "I know it is, and since everybody knows that, it just is." When a student is experiencing frustration in explaining his or her understanding, he or she might react by saying, "You're a teacher! You wouldn't understand!"

- Egocentric communication. Feuerstein

suggests that egocentric communication is a function of a *lack of differentiation* that prevents individuals from seeing others as different from themselves. It involves an inability to put themselves into the "shoes" of the listener. The student may display the attitude: "How can he think differently than I do? How is it possible that she doesn't know what I know? Everybody knows that!" Because of this attitude, the student will limit his or her communication in terms of detail, precision, and logical evidence.

- Trial-and-error responses. Teachers nor-

mally try to encourage trial-and-error behaviour as a means of teaching rules and principles, while at the same time encouraging the sense of discovery in the student. Feuerstein suggests that the following cognitive functions are necessary prerequisites to learning by this method: precise perception, comparative behaviour, summative behaviour, reflective thinking, and an orientation to search for causal relationships. He suggests that for students who are deficient in these functions, the trial-and-error approach to learning may actually encourage and reinforce a kind of probabilistic, random behaviour. Learning then becomes a hit-and-miss affair.

- Efficiency of visual transport. Visual

transport involves the ability to visually transport a missing part across a given distance, or choose the complementary missing part from a number of alternatives. Two factors that Feuerstein suggests are involved in the difficulty of visual transport are the instability of the perception itself (the inability to retain a mental image) and the problem of the individual becoming diverted by irrelevant data once his or her eyes have strayed from the source.

- **Figure-ground problems.** Figure-ground problems may be involved in the auditory or visual channels as follows:

- a) Individuals with auditory figure-ground difficulties have problems talking or listening on the telephone while there is noise from a television or radio in the background.
- b) Individuals with visual figure-ground difficulties have problems focusing on one item in a visual array. They fail to differentiate between the focal item and the background. To reverse a common phrase, they literally cannot see the trees for the forest.

Figure-ground problems result from a confusion or inability to isolate predominant items.

- **Lack of closure.** Lack of closure may be experienced in the visual or auditory channels. Visual closure is the process of recognizing objects, letters, or words from an incomplete visual presentation. Auditory closure is the process of recognizing the meaning of spoken language when parts are missing.

- **Short attention span.** The student who exhibits a short attention span allows his or her mind to wander during class and frequently does not complete assigned tasks.

- **Poor memory.** Students with poor memory quickly forget previously learned material. They also fail to categorize, chunk, or otherwise organize material in a way that will permit easy recall. Students who have difficulty remembering what they hear or see are likely to have underlying higher-cognitive-linguistic difficulties. Thus, auditory and visual memory should not be treated as discrete skill areas.

Memory should not be considered as an entity in and of itself. It is the outcome of a set of strategies and processes that are interrelated. Two of these, for example, are associative memory and the use of mnemonic devices. Associative memory is the process of relating or connecting concepts and remembering them. Mnemonic devices are methods of association of images, words, or ideas to assist memory.

- **Underdeveloped general knowledge.**

Students whose life experiences are generally narrow frequently have difficulty establishing their relationships to their own environments or establishing views of themselves or of their roles in the world. They also often have difficulty with classification and making generalizations.

While all of these difficulties affect the learning process, no one learning-disabled student will exhibit all of them, although he or she may exhibit such difficulties either singly or in any combination. However, while some learning-disabled students will have many difficulties with the learning process, it must also be remembered that they are individuals who have a diverse number of strengths and capabilities that will require recognition and encouragement to be developed.

In "Cognitive Behaviour Modification for Children", Donald Meichenbaum and Sidney Burland describe the goals and methods of a program known as "Cognitive Behaviour Modification" (CBM), which has been devised and used for metacognitive training. Initially directed towards the modification of social behaviour, CBM has now been applied to academic concerns as well. The CBM academic-training program is based on the task-analysis approach of the American psychologist Gagne. The goal of metacognitive training is to provide students with a content-free cognitive-control system that they can use in a general way to deal more adaptively with academic, self-control, and interpersonal problems.

Modelling is a key factor in the CBM process. Teachers consciously model appropriate, productive, social or cognitive behaviour. To do this they must determine the thoughts, strategies, and rules needed to do a given task. This can be achieved by observing their own thinking processes and by observing and questioning students who do well or poorly on a task. The teacher can then translate these observations into sets of "self-statements", which can be modelled and rehearsed by the student. Furthermore, teachers should model their own coping strategies; they should demonstrate for their students how they deal with failure and frustration. According to Meichenbaum and Burland, an effective cognitive-control system requires the ability to:

- *identify* and characterize the problem at hand;
- *assess* one's capacity to meet task demands;
- *plan* and schedule appropriate problem-solving routines;
- *monitor* the effectiveness of the attempted routines.

Through training to acquire these skills, students become aware of their capacity limitations and their repertoire of problem-solving strategies.

In his discussion of metacognition in "Metacognitive Aspects of Problem Solving", John Flavell stresses the "how, when and where" of information storage and retrieval. He refers to a lack of skill in any or all of these areas as "production deficiency". *How* includes strategies for storage and retrieval; *where* includes a variety of storage and retrieval resources, both human and non-human (e.g., tapes, computers); and *when* refers to the student's awareness of those situations that demand the conscious acquisition and storage of information, as well as an awareness of situations that demand the conscious search for and retrieval of information, either internally or externally. While not giving suggestions for teaching methodology, Flavell suggests that children must be taught to respond to such general requisites as the following:

- carefully examining task features to identify the problem (What am I expected to do?);
- searching both internal and external sources for solution-relevant information and procedures (What information do I have already?);
- keeping track of past solution efforts, their outcomes, and the information yielded, and using external records when appropriate (comparing an existing problem to previous experience);
- actively remembering to remember, monitoring and updating information, and using this information in problem solving (consciously utilizing a strategy to assist memory, such as association, mnemonic devices, and mind mapping).

Social and Personal Factors

Difficulties in perception, language, and cognition are related to the following social and personal factors:

- **Self-concept.** Students with learning disabilities often fail repeatedly, regardless of their efforts. As a result, such students frequently have a poor self-concept. They feel "dumb" because of an inability to do what other students can do, and often because other students, through gestures or comments, reinforce their negative opinion of themselves. Consequently, they may become withdrawn or they may act out their frustrations when the limits of their tolerance and patience have been reached.

- **Social perception.** Closely related to language difficulties is the problem of lack of social perception. Students with this type of difficulty do not understand, and have failed to learn, appropriate behavioural responses. They have difficulty interpreting facial expressions, body gestures, and voice tone and inflection. Thus they often react inappropriately.

- **Behaviour.** Behavioural difficulties include overactivity, distractibility, short attention span, aggression, perseveration, and emotional outbursts. Though such symptoms are at some time manifest in all students, they are more consistent and persistent in some students with specific learning disabilities and in students with behavioural exceptionalities. In the case of students with learning disabilities, the behaviour is largely the result of frustration in not being able to satisfactorily execute tasks of which they are capable. Students with behavioural exceptionalities, on the other hand, are generally unable to execute tasks because their emotional state interferes from the outset.

Identification and Assessment

Early Identification of Learning Needs and Abilities

Educators and researchers interested in optimum education for young students are concerned that early identification serve not only to identify learning-disabled students, but to provide appropriate intervention as well. This may be as simple as the provision of a more suitable seating location for a student with an attention problem, books to the student who is an able reader, a part-time remedial program to develop a student's reading skills, or special-class placement for a student with a severe learning disability.

In order to encourage the provision of programs to match the individual learning needs and abilities of students so that each child can participate as completely as possible in education programs, the Ministry of Education has issued policy statements that make early identification procedures mandatory for all school boards. The ministry's memoranda 1978-79: 15, 1979-80: 24, and 1978-79: 14 (now Policy / Program Memorandum No. 8, 1982) articulate the following ministry policy:

- Each school board must have an approved procedure, in English or French as required, to determine each child's learning needs and abilities when the child is first enrolled in school or at least by the time the child is beginning a program of studies immediately following Kindergarten.
- The identification procedure should provide for confidential information gathering in the form of a health or social history or both to be part of the student's Ontario Student Record folder; general opportunities for parents and teachers to share important information about students' background and development; an education assessment administered by the teacher that includes the communication areas (language and mathematics); and a multidisciplinary approach, where required, to provide assessments by professionals outside of the

classroom for children identified by teachers as having special needs.

- A variety of strategies should be used to maintain an ongoing review of each child's emotional, social, intellectual, and physical development. Such continuous assessment should be followed up with suitable programs.
- Any information derived from assessment should be treated as tentative and temporary; it is not appropriate to use these data to predict children's long-term achievements.

It is the school's mandate to accept each student as he or she is, irrespective of the different sets of attributes, attitudes, aptitudes, and expectations that the student brings to school, and to provide an appropriate program and learning environment for the student. The early identification procedure, as outlined by the ministry, is viewed as a means of determining the students' skills, aptitudes, abilities, and stage of development.

As a result of the early identification procedure, the teacher should be able to determine the types and levels of program activities required to meet the students' needs. The early identification procedures should be viewed positively as a means of identifying high as well as low performers and strengths as well as weaknesses. Early identification procedures are seen as the first stage in an ongoing assessment of a student's progress.

Given the policy of the Ministry of Education, it is essential that school personnel consider very carefully the purposes, procedures, and implications of any early identification program. Since the purpose of the identification procedures is to provide instruction that matches student needs in terms of acquired skills, abilities, and stages of development, the identification procedures must be appropriate for each grade level. Teachers must be fully aware that the purpose of the identification program is to provide the appropriate teaching-learning match for each student.

A second-stage procedure, for students identified as having very special learning needs, involves an individual diagnostic evaluation. According to Policy / Program Memorandum No. 8, 1982, this evaluation should be based on some or all of the following:

- continuous educational assessment;
- detailed health assessment (hearing, vision, physical, and neurological);
- psychological assessment;
- language assessment;
- social or family history; and
- assessment of observed behaviours in a variety of settings.

It is important that students' learning needs be identified as early as possible in their school careers. Most students come to school with considerably developed motor, language, and cognitive skills. However, in the area of language, many first-grade students experience difficulty because they are unable to understand and process the formal language of classroom instruction. It is important, then, that they receive the stimulation and instruction that will develop and enhance their motor, language, and cognitive abilities during these critical years. Progress at this stage can be remarkable because little time is needed to unlearn the inappropriate practices that might later become deeply entrenched.

General Indicators of Learning Disability

The possibility of a student's having a learning disability can often be suggested by his or her health or medical background. For example, learning disabilities are often associated with the following conditions related to a child's birth: an excessively prolonged labour, unusually difficult delivery (especially after an earlier easy delivery), low birth weight, premature birth, and such birth-related conditions as anoxia. The child's developmental history can also suggest the possibility of the existence of a learning disability.

Late or abnormal development (e.g., in sitting up, crawling, walking, or speaking; prolonged walking on tiptoes) should be noted, as well as such symptoms as overactivity and underactivity. The existence of past or present medical problems such as strabismus (a condition often indicated by the individual's being cross-eyed or walleyed) or a period of convulsions can also be related to learning disabilities. Finally, any incidence of learning disabilities, diabetes, mental illness, or alcoholism in the child's family should be noted.

Teachers can also rely on behavioural observation of their students for indications of learning disabilities. For example, the following general characteristics may be associated with learning disabilities:

- overactivity
- short attention span
- confusion about directions in space or time
- inability to follow a series of spoken directions
- unusual craving for sweets
- low blood sugar
- ambidexterity (after eight years of age)
- reversals of letters or words
- persistent spelling errors
- difficulty in catching or kicking a ball
- inability to skip rope
- difficulty with buttoning
- difficulty with tying shoelaces
- cramped pencil grasp
- poor handwriting
- disturbances in gait
- inability to crawl or skip
- excessive clumsiness
- frequent falling
- hesitation in walking downstairs
- difficulty in standing on one foot
- difficulty in learning to ride a bike or walk a rail

The following characteristics may indicate that the student has problems with his or her vision:

- severe head tilt
- symptoms of visual stress (e.g., squinting, blinking, eye rubbing, watering eyes, skipping lines or words while reading, head too close to paper when writing, drawing, etc.)

Emotional and behavioural problems may be indicated by the following:

- poor self-image
- high degree of hostility or anger (e.g., tendency to temper tantrums)
- low frustration level
- excessive impulsiveness
- withdrawn or disoriented behaviour

These may be related to social problems such as the tendency to gravitate towards younger playmates, difficulty in establishing peer relationships, or the avoidance of unfamiliar social situations.

The following list of specific skills has been compiled to aid Kindergarten teachers in identifying students with learning disabilities. If a pupil lacks a few of these skills, it should not be concluded that he or she necessarily has a learning disability. Many children at this age show uneven development but are not learning-disabled. However, if many of these skills have not been mastered, a detailed assessment, involving support services, should be considered.

It is suggested, therefore, that students at the Kindergarten level should be able to:

- tie their shoelaces
- dress independently for outdoor play and to return home
- colour and trace between lines
- catch and throw a ball
- hop on one foot
- print their names in upper- and lower-case letters (e.g., "Sally")
- identify the letters in their names
- identify the majority of the letters of the alphabet
- recognize colours
- identify the numbers 0 to 9
- repeat their telephone numbers and addresses
- identify left-to-right progression
- recognize simple shapes (e.g., circle, square, triangle)
- follow short, simple directions
- work independently on a short task

Students With Severe Attentional Deficit Disorders and Hyperactivity

The Hyperkinesis Research Unit at the University of Guelph has developed the following checklists to identify this group of severely learning-disabled students. Although these instruments are still in the developmental stage, they have been found effective, as part of a comprehensive assessment procedure, in identifying this special learning-disabled population.

Modified Werry-Weiss-Peters Activity Scale

Student's Name: _____

Assessment Interval: _____

Date: _____

Evaluator: _____

Does the child:

<i>Not at All</i>	<i>Just a Little</i>	<i>Pretty Much</i>	<i>Very Much</i>
-----------------------	--------------------------	------------------------	----------------------

A. During Meals

- rise up and sit down frequently at table?
- interrupt without regard?
- wriggle?
- fiddle with things?
- talk excessively?

_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

B. While Watching Television

- rise up and sit down frequently during programs?
- wriggle?
- manipulate object or body?
- talk incessantly?
- interrupt?

_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

C. During Play

- show an inability to play quietly?
- constantly change his or her activity?
- seek adult attention?
- talk excessively?
- disrupt others' play?

_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

D. With Regard to Sleep

- have difficulty settling down to sleep?
- obtain an inadequate amount of sleep?
- appear restless during sleep?

_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

E. While Away From Home (Except School)

- exhibit restlessness during travel?
- exhibit restlessness during shopping (including touching everything)?
- exhibit restlessness at church or movies?
- exhibit restlessness while visiting friends, relatives, etc.?

_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

F. In School

- frequently get up and sit down?
- fidget, wriggle, or touch things?
- interrupt the teacher or other children excessively?
- constantly seek the teacher's attention?

Subtotal *× 0* *× 1* *× 2* *× 3*

Total (_____)

Benchmark

A score of 38 points or more suggests LD with ADD and hyperactivity.

Behaviour Symptoms Checklist

(Modified from Werry & Quay, 1971)

Student's Name: _____

Assessment Interval: _____

Date Completed: _____

Evaluator: _____

Behaviours

Not at All Just a Little Pretty Much Very Much

1. weird, wild, or strange behaviour
2. restlessness; inability to sit still
3. attention-seeking, "show-off" behaviour, "watch-me" attitude
4. does not know how to have fun; behaves like an adult
5. self-conscious; easily embarrassed
6. fixed expression; lack of emotional reactivity; deadpan look
7. disruptiveness; tendency to annoy others; "bugs" people
8. steals in company with others
9. boisterous; rowdy; stirs things up
10. cries over minor annoyances or hurts
11. preoccupation; in a world of his or her own
12. shyness; bashfulness
13. social withdrawal; prefers solitary activities; likes to play alone
14. jealous over attention paid to other children
15. short attention span; cannot concentrate
16. lack of self-confidence; afraid to try new or different activities
17. inattentive to what others say; does not listen
18. easily flustered and confused
19. incoherent speech, difficult to understand what child says; speech problems; speaks rapidly
20. fighting
21. temper tantrums; "blows up" for no apparent reason
22. reticent; secretive; holds back feelings; does not communicate well
23. hypersensitive; feelings easily hurt
24. laziness in school or in performance of tasks
25. anxious; general fearfulness
26. excessive daydreaming; escapes into make-believe world
27. tense; unable to relax
28. impulsive; acts without thinking
29. disobedient; difficult to control; creates discipline problems

Behaviour Symptoms Checklist (cont'd.)

Behaviours	Not at All	Just a Little	Pretty Much	Very Much
30. depressed; chronic sadness; unhappy	_____	_____	_____	_____
31. uncooperative; does not share; works poorly with others	_____	_____	_____	_____
32. aloof; socially distant; does not mix with others	_____	_____	_____	_____
33. passive; easily led by others; copies others	_____	_____	_____	_____
34. clumsy; awkward; poor muscular control	_____	_____	_____	_____
35. restless; always on the go; cannot sit still	_____	_____	_____	_____
36. distractible; notices everything; difficulty paying attention to one thing	_____	_____	_____	_____
37. destructive in regard to his or her own or others' property; deliberately destroys or damages things	_____	_____	_____	_____
38. negative; tends to do the opposite of what is requested	_____	_____	_____	_____
39. impertinent; saucy; talks back; rude	_____	_____	_____	_____
40. fails to complete tasks; does not complete what is started	_____	_____	_____	_____
41. sluggish; lacks pep; does not care	_____	_____	_____	_____
42. defiant; dares you to punish him or her; disregards instruction	_____	_____	_____	_____
43. profane; swearing; cursing	_____	_____	_____	_____
44. nervous; jittery; jumpy; easily startled	_____	_____	_____	_____
45. irritable; hot tempered; easily aroused to anger	_____	_____	_____	_____
46. difficulty interacting with peers; social outcast; cannot get along with other children	_____	_____	_____	_____
47. often has physical complaints: headaches, stomach ache	_____	_____	_____	_____
48. constantly changes activities	_____	_____	_____	_____
49. wets bed at night; wets pants during day; requires diapers during day or night	_____	_____	_____	_____
50. drowsiness; sleepy behaviour during day; slow moving	_____	_____	_____	_____
Total	()	()	()	()
	×0	×1	×2	×3
Total Score:	()	()	()	()

Benchmark

A score of 60 points or more suggests LD with ADD and hyperactivity.

Assessment of Readiness

Student readiness can be assessed by a combination of standardized readiness tests, teacher observation, student health records, and additional information derived from parent-teacher interviews. Most readiness tests provide only a global score indicating a student's position from low to superior in relation to the normative group. Since they do not differentiate a student's performance on each of the subtests, they do not indicate learning strengths or weaknesses.

Many identification procedures aimed generally at the Kindergarten population, either at the beginning or end of that year, were developed in an effort to determine a student's learning strengths and weaknesses before the student experiences failure. Such procedures include anecdotal records, observational data, checklists, rating scales, inventories, and individually administered tests (e.g., De Hirsch Predictive Index) and group-administered tests (e.g., Slingerland Pre-Reading Screening Procedures and Gates-MacGinitie, Lee-Clark, Clymer Barrett, and Metropolitan readiness measures).

It must be remembered that a readiness test is only one measure of a student's performance and that some students may not function well in test situations. While some confidence can be placed on high readiness scores as predictors of normal or high achievement, low scores less accurately predict low achievement because many students may do poorly as a result of a wide range of problems. Predictions based on low overall performance on a readiness test should be viewed with some scepticism because of the many factors that may contribute to that performance. Thus, standardized tests should not be relied on as the sole measure of students' strengths and weaknesses.

There is a general consensus that teacher-rating scales, containing at least a behavioural and an academic component or an observational checklist of basic school skills, provide a very reasonable and useful screening technique when administered within the classroom by the teacher. In addition, rating scales, observational checklists, or inventories based on the behaviours and skills necessary for entry to a specific grade identify what students need to learn and thereby provide information that the teacher may immediately use for effective program planning. Sufficient data is also collected in this way to identify those students who require an extensive, individual diagnostic study.

Many rating scales are available from test suppliers. However, teachers may design a very comprehensive inventory, related to their own circumstances, by using the information on page 45 of the ministry publication *Education in the Primary and Junior Divisions* (Toronto: Ministry of Education, Ontario, 1975). An effort should be made to include items that will provide information on students' readiness in terms of their number, language, and motor skills as well as their behavioural characteristics. Through devising and implementing rating scales, checklists, or inventories directly related to the program, the teacher becomes more acutely aware of the demands of the program, the general needs of the students in relation to the program, and the specific needs of some students relative to their peers.

In addition to information derived from a formal standardized assessment and an observational assessment, it is important to gather information concerning a student's physical condition (e.g., general health, nutrition, allergies, vision, hearing). The month in which the student is born is also important. Many, if not most, students having difficulties in school are students who are too young for their grade placement. Students born in October, November, and December may be at a distinct disadvantage when the expectations for them are the same as for their classmates who may be close to a year older. At age five or six years such a difference may be considerable, since it represents one-fifth or one-sixth of the student's life span.

When the classroom teacher has accumulated all of the data with respect to a specific student, an analysis of that data will determine the student's needs so that an individualized program can be planned. When the student's needs cannot be met within the classroom, an appropriate intervention program should be planned with the involvement of special education, remedial, or resource personnel, who may wish to supplement the teacher's findings through the use of further individual diagnostic measures to provide more specific information as to the nature of the student's difficulties.

In some cases a co-operative program may be required in which the teacher uses special education techniques and procedures in the regular

classroom. In other cases students may require part-time withdrawal. Because of the severity of their difficulties, a small number of students may need to be referred to the educational psychologist for a complete formal assessment of their cognitive, motor, social, and language functioning. Whatever assessment is done, the results, as well as the implications of the findings with respect to classroom instruction, should be discussed with the teacher. Specific suggestions should be offered to the teacher in order to increase the student's learning opportunities, whether that student remains in the regular classroom, receives a partial-withdrawal program, or is placed in a structured special class.

Teachers should regard the results of all screening procedures as tentative, since many factors contribute to the degree of risk and since students change so rapidly. Some students may be classified as "high-risk" and subsequently have no problems, while others may be considered "low-risk" and subsequently experience learning difficulties. None the less, screening practices have the potential to be very effective.

Formal and Informal Assessment

The Education Amendment Act, 1980, requires that an educational program for an exceptional pupil be "based on and modified by the results of continuous assessment and evaluation". In attempting to meet the needs of the individual student, it is the teacher's responsibility to accumulate data concerning the student's competencies and learning strategies as well as what the student has learned, and failed to learn, in relation to his or her age and ability level. Data of this nature may be obtained through either informal or formal assessment procedures. Any comprehensive assessment will include a combination of both, as well as any other information that may have an effect on the student's learning (e.g., accidents since Grade 1). All of the information collected in this way should be translated into instructional programs and strategies that are appropriate to the student's needs.

Informal and formal assessment procedures have distinct characteristics, advantages, and disadvantages that must be weighed in relation to their purposes and the resources and time available for their administration and interpretation.

Formal assessment. This kind of assessment makes use of standardized tests, which are normally administered on a one-to-one basis in a carefully controlled situation other than the regular classroom. A variety of tests is usually administered to sample the student's cognitive functioning and vision, hearing, speech, and language skills, as well as his or her performance in the basic skills. Social, physical, emotional, and personality factors are often assessed to provide additional information. Thus formal assessment provides information on the academic, cognitive, motor, health, language, and behavioural functioning of the student in relation to his or her peers. The resulting profile of the student's patterns of observed behaviour highlights his or her strengths and weaknesses.

The following are some of the disadvantages of formal assessment:

- The testing situation (one-to-one situation) may be unrelated to the classroom situation in which the student functions daily.
- Although a variety of scores may have been obtained, they may not specifically relate to the classroom situation, and, in their raw form, may not provide the teacher with any new information. For example, a report indicating that a student is found to have an "auditory memory problem" communicates little to the classroom teacher.
- The student with learning disabilities may be at a disadvantage when he or she takes an intelligence test. For example, a student with a language difficulty may record a lower score than his or her actual level of intelligence because most intelligence tests are linguistically based.
- Normative information is gathered and interpreted in formal diagnostic procedures. This can discriminate against special populations. For example, it would be inappropriate to assess the intelligence of a newly immigrated Caribbean student using the WISC-R, which is normed on students in the United States, because differences in language usage, cultural customs, and background information would inevitably depress the student's score.

- It should be remembered that a single standardized testing situation cannot allow for the day-to-day variability in students. Students tend to react differently on different days and to different examiners.
- *The validity of many standardized tests, particularly those designed to assess perceptual skills and those designed to assess intelligence, is being increasingly questioned.*

In summary, formal assessment can provide information for the teacher, but in certain areas this information has its limitations. In general, it should be considered supplementary to other, informal information. In the area of academic assessment, however, formal assessment provides parents with direct information on how their children are performing in comparison with their peers. Parents have a right to this information, and it is the teacher's duty to provide it.

Informal assessment. This kind of assessment is generally carried out by the classroom teacher, the teacher-diagnostician, and the remedial teacher or the resource teacher and should include information from other persons with whom the student may interact. To this end, assessment techniques should be related to the content of instruction, as well as the teacher's method of instruction and the expectations for the student. Teachers' expectations, which are sometimes too high or too low, have a tremendous bearing on a student's functioning within a specific classroom. Informal assessment provides an opportunity for the teacher to reassess his or her own expectations in view of the student's ability to perform a task and the difficulty the student encounters in doing so.

Teachers may wish to develop their own batteries of informal tests that provide an indication of the student's functioning in each of the areas outlined in the formal assessment. In addition, the teacher may use daily situations (e.g., oral lessons, informal lessons, seat-work exercises, written assignments and projects, play situations) to observe, collect, and record information that will be useful and relevant to the provision of effective instruction. In doing so, the teacher's frame of reference should be the group of which the student is a member. During informal assessment the teacher must be attentive to (a) what the student does, (b) how the student does it, and

(c) what the outcomes are. The teacher must observe and record outcomes, analyse them, and determine what teaching the student requires.

Any comprehensive informal assessment must consider the following five factors:

- **The student's age.** The student's age, especially the month of birth of Primary pupils, should be noted in relation to the others in the group. There is evidence that the majority of students experiencing learning difficulties have a birthdate in the last three months of the year.
- **Cognitive functioning.** Although intelligence test scores are often included in a student's record, a teacher must be careful not to attribute undue credence to the score until the test itself is understood and the circumstances under which it was administered and the student's reaction to the circumstances are examined. It is more important that the teacher be aware of the way in which a student handles learning tasks in informal situations where the student is exposed to things he or she wants to learn, and also of his or her contribution in oral situations. These indicators may be more reliable than the designated intelligence quotients as measured by an inappropriate test.
- **Physical condition.** Teachers should consider the following questions: Is the student in good health? Is the student subject to specific illnesses and / or allergies? Has the student adequate sensory functioning? Motor? Vision? Hearing?
- **Social and cultural background.** Teachers should consider the following questions: Does the student come from an enriched or disadvantaged background? Has he or she had the normal childhood experiences? Are the language and / or culture of the student different from the rest of the group?
- **School history.** Any changes of schools, or teachers, absences, progress to date, and grades repeated should be noted.

This information can provide the teacher with an initial understanding of the nature of the student's learning difficulties and a preliminary knowledge of some of the contributing factors. Further insight into the student's learning disabilities can be attained through the assessment of basic skills.

Language Assessment

Underlying any comprehensive assessment or evaluation is an understanding of the nature of the behaviour to be assessed and the realization that there are no quick and easy recipes for obtaining this information. In the area of language, information that will be most meaningful in educational planning will be derived from the observation of the student in "naturalistic settings" (i.e., the way the student actually functions on a day-to-day basis in the classroom and with peers). For example, a student's score on an achievement test in a language-related area is not nearly as pertinent as the strategies employed to achieve that score. Evaluating performance based on the percentage of correct answers alone tells little about how a student learns. Thus the teacher must approach evaluation from a qualitative rather than a quantitative framework. This necessitates not only looking at the student's response itself, but viewing it in relation to the instructions given and the stimulus materials presented.

Additionally, students' language behaviours should not be viewed in isolation. For example, some language-disabled students approach

a listening-comprehension task by trying to remember the information verbatim rather than trying to determine its meaning. Students who do this frequently have difficulty recalling all of the facts, and poor memory is often identified as the source of the difficulty when in fact it may be the result of inefficient language strategies. Similarly, the student who reads *was* as *saw* may be demonstrating a subtle linguistic difficulty rather than a visual-sequential-memory problem. Such a student may not be co-ordinating the single word being decoded with the surrounding context.

It is interesting to note that learning-disabled students often have difficulty learning to read and spell words representing the smaller parts of speech (e.g., *the, there, here, you*). One reason that words such as these may be more difficult for students to learn and remember is that their meanings and roles in a sentence are subtle. Thus, the student may not have weak visual-memory skills but rather may have difficulty with the more subtle aspects of language.

It is also important to discern any patterns that may exist. For instance, students who perform poorly on listening-comprehension tasks may do so for different reasons. One student may have particular difficulty with facts and details, while another may have problems making inferences. Needless to say, the teaching approach required for each student will vary.

These are only a few examples to illustrate how important it is to utilize a qualitatively based approach to evaluation. The charts on pages 18–21 provide some suggestions to help teachers to evaluate the language functioning of their students.

Placement

The Ontario Ministry of Education believes that "every exceptional child has the right to be part of the mainstream of education to the extent to which it is profitable."¹ Some exceptional pupils may, however, require specialized program or placement provisions.

The degree of a student's learning difficulty should determine both the nature of the instructional program and the type of placement for that student. Some students can be served very adequately within the regular classroom, if the teacher uses carefully chosen approaches. A special education consultant or resource teacher can help the classroom teacher select and organize materials and instructional approaches that are suited to the needs of these students, both in the initial stages of the program and as the need arises later on.

Other students may require assistance outside of the regular classroom. This assistance should be available on an individual or small-group basis for part of the day. A resource room teacher, itinerant special education teacher, or classroom assistant should be assigned to schools, depending on their needs.

Finally, some students may require placement in a special education class or an alternative school for students with learning disabilities. Parents must be consulted concerning placement and, wherever possible, the students themselves should be involved. It should always be remembered that, where special education programs and services are provided, the objectives of these programs and services are no different from those for all students. However, special education programs and services should permit teachers to focus more intensively on each student's individual educational needs.

Regular-Classroom Placement

Whenever possible, the student with learning disabilities should be maintained in the regular classroom for all or part of the school day. Several classroom-management alternatives are possible, although some special adaptations, dispensations, and expectations are required for these students. It may seem difficult in a classroom of thirty or more students for a teacher to find the time necessary to be accepting of and responsive to a single student who may have learning disabilities. However, the student's difficulties may be alleviated without placing undue stress on the teacher's already heavy load through such measures as the following.

Within-class grouping

Flexibility in class grouping is perhaps the first strategy that a teacher should try. If, for example, the student cannot keep up in mathematics, he or she can work with a less advanced group and can join other groups as his or her performance improves. However, care should be taken when moving a student to a more advanced group that the student has mastered all of the concepts necessary to function in the second group. This indicates the necessity for individual teaching, which may make use of any of the following tutoring-assistant schemes:

- a) **Buddy system.** The teacher assigns a capable student to assist the learning-disabled student with difficulties in whatever ways are required. Students are advised to seek help from their buddies whenever they do not know what to do or how to do it. Because students learn best from each other, the buddy

1. Ontario, Ministry of Education, *Education in the Primary and Junior Divisions* (Toronto: Ministry of Education, Ontario, 1975), p. 12.

system can be a powerful help to learning-disabled students.

- b) **Senior tutors.** Students in higher grades, either from within the same school or from a higher-level school nearby, can be asked to provide assistance to younger students experiencing difficulty. The tutor and student should meet at a specific time and on a regular basis or, if both attend classes in the same school, the older student may be called on as problems arise.
- c) **Volunteer tutoring.** In any school area there are interested and capable college students, parents, senior citizens, retired teachers, and so on, who can be asked to provide individual tutoring for students who are having difficulties.

Adaptations and dispensations

If a student is continually unable to complete the amount of paper-and-pencil seat work required, the teacher may:

- a) require only partial completion, expecting, however, that the work be well done;
- b) require only one- or two-word responses instead of complete sentences;
- c) require printed responses for as much of the work as possible, and then oral responses for the remainder;
- d) provide a workbook or work sheet in which the student can fill in his or her responses. To acquire the necessary pencil practice, the student would still complete the same exercises assigned to other students, but only insofar as he or she can complete them well.

For organizational and spatial problems, as in other areas, the teacher's expectations must be made clear to the students. The following are some suggestions for dealing with organizational and spatial problems:

- a) **Personal possessions.** For a student who is unable to organize personal possessions, the provision of a specific place (hook or locker) will be necessary. This should be labelled with the student's name and the student should be shown exactly how and where things should be. Similarly, the student's desk and books should be organized in an easily accessible and maintainable manner.
- b) **Dating.** If work is to be dated, students should be shown where to place the date and how to record it.

c) **Margins.** Students should be shown where the margin should be and how wide it should be. Drawing a margin with a green line emphasizes the starting place.

d) **Numbering.** Students should be shown by example and through chalkboard work how and where to number.

e) **Spacing.** The teacher must indicate how large a space should be left between items and should show students how to space letters and words on a line.

Learning-disabled students need repeated good basic teaching. What regular classroom students may be able to internalize very quickly, learning-disabled students may need repeated on an ongoing basis. This does not mean that these students are lazy or stupid, but that organizational, spatial, or memory tasks are particularly difficult for them. First-grade students often learn to space words by using their index fingers as spacers to show that the next word starts at the side of the finger. For left-handed students (for whom this may be difficult), a small cardboard spacer or a small eraser or pencil will provide adequate spacers. Students need to be shown what to do when they reach the end of a line, when it is not the same as the example or when it is not the end of the sentence. Students need to be shown that you do not print or write across the other side of the book, but instead move down to the next line. If the work is to be completed in columns, showing students how to fold the page lengthwise in halves, thirds, and quarters will provide an organizational and spatial structure for dealing with addition, subtraction, multiplication, and computational problems, synonyms (*big-large*), opposites (*big-little*), or lists (e.g., of birds, animals, toys).

Multisensory materials

As many visual, auditory, and tactile materials (e.g., pictures, slides, films, concrete objects, demonstrations, illustrations) as possible should be used to hold students' attention and to allow them to relate to what they see and hear. For students who have difficulty understanding oral instructions, the instructions should be printed in point form on the chalkboard or a work sheet. Such students can also be assigned buddies to whom they may go when they have problems understanding an oral presentation.

Students can be supplied with cues to which they can refer. For example, a cue card with appropriate pictures for *b*, *d*, and *p* can be taped to a student's desk for ready reference until the student has sorted out the differences in the letters.

In the same way, printing the first letter of a word in green to emphasize the left-to-right directionality may help to alleviate *saw-was* or *no-on* problems. When they encounter one of these confusing words in their reading, students can be asked to trace and say the first letter (or sound of the letter). Retrieval problems are often relieved when students are allowed to subvocalize the steps to be accomplished. If a motor component (copying or tracing) is added, memory is even further reinforced.

Though some of the organizational procedures mentioned may seem to be too basic for some students who have organizational and spatial problems, it is important that the teacher provide very specific directions to indicate what is desired, and in all teaching lessons and exercises (work sheets, demonstrations, chalkboard work) present a model of desirable organization and spacing. Attention to these specific aspects of students' work at the beginning of each year will alleviate many problems that are otherwise inevitable. Rather than conclude that students are simply disorganized, the teacher accepts the responsibility for teaching good organizational procedures.

All of the above options and procedures are both feasible and practical and may allow students with learning disabilities to remain within the regular classroom. There are, however, students whose difficulties may require more specialized instruction than can be offered by regular classroom teachers, even with the assistance of tutors and volunteers. For these students a partial withdrawal arrangement may be necessary.

Resource Programs

In resource programs, exceptional students usually remain within their regular classrooms but are withdrawn several times a week for specialized instruction for not more than half of their regular class time. In this way the students' specific difficulties can be identified, and appropriate teaching techniques and materials can be arranged.

For example, instruction might be aimed at developing a student's ability to complete assigned work. In this instance, student attention is focused on such tasks as: reading and understanding instructions; planning what to do, how to do it, and the order of what is to be done; organizing and preparing the materials needed; and developing copying skills (accuracy and fluency of letter formation, reading and rehearsing what has to be copied, repeating to oneself as one copies, then checking for accuracy).

One requirement of resource teaching is that it be closely related, and applicable, to the regular

classroom situation. For this reason, there must be very close association and co-operation between the regular classroom teacher and the resource teacher. In addition to the nature of the assistance the student is receiving, the regular classroom teacher must be alert to any difficulties that may arise in the presentation of lessons, so that the resource teacher may provide needed reinforcement to remove a block to learning. Resource teaching, especially when introduced at an early age such as six or seven, can result in over 80 per cent recovery.

For students whose learning difficulties are not specific to a single area, a remedial or resource program three or four times a week may be insufficient. Such students may require a part-time special class or half-time arrangement. This type of program may be arranged for either students in the regular class or those enrolled in special classes. The former may spend a specified period each day in a special class receiving extra instruction from a special education teacher in the academic area(s) presenting difficulty. Students in special classes may do the opposite: leave the special class, where specialized instruction is provided in all of the basic skills, and attend regular classes (e.g., for physical education, art, music, social studies, or science). In either case, it is essential that the regular and special classroom teachers establish a communicative and co-operative relationship and that they work together to resolve the student's learning difficulties and any scheduling problems.

Special-Class Placement

There is a small number of learning-disabled students whose learning disabilities are so severe that a special class may be the most appropriate placement for them. In Ontario, the number of students in special learning-disability classes is restricted by legislation (Regulation 262 / 81, 35[a]) to a maximum of eight students. Even though this limit has become the usual class size for these students, there may be instances when the nature of a student's difficulties indicates the need for a smaller class size and / or the addition of support assistance (e.g., a teacher aide). This is likely to be the case with very difficult-to-serve students, such as those with severe attentional deficit disorders and hyperactivity. Placement in a special class is dependent on the recommendation of an identification, placement, and review committee and the written permission of the parent or, where the student is an adult, of the student.

The special education class teacher must possess a knowledge of informal assessment

techniques and an ability to present instructional programs consistent with the curriculum and appropriate to each student's type and level of functioning. Regulations require an ongoing evaluation of the program as well as a yearly review to determine its effectiveness and to initiate any necessary improvements.

Whenever possible, students attending a special class should be provided with opportunities to join their regular class peer group and to follow the regular program for those subjects in which they are competent. The total integration of each special-class student in the regular program should be the ultimate goal, but this must be carefully planned and gradually put into effect. For example, before attempting to integrate a student for any one subject, the student's competency in that subject should have reached

at least the average ability level of the regular class. This is essential because, once integrated, the learning-disabled student will no longer have complete access to the individual instruction and attention that is available in the special class.

As the student's competencies develop, his or her integration can be expanded to include two subjects, then three, and so on, until the integration of the student is complete. If the student experiences adjustment difficulties it may be necessary for the special-class teacher to provide back-up assistance. Ultimately, the learning-disabled student should achieve self-sufficiency in learning. It is therefore essential that the special-class teacher provide the learning-disabled student with some strategies for coping with any difficulties that may be encountered in the regular classroom.

Personalizing Instruction

The Learning Environment

In the ideal classroom, happy students work at tasks that are rewarding to them with a teacher who is sensitive to their needs and who facilitates and guides their learning. Such classrooms have the following in common:

- The teacher has created a high-trust, low-fear atmosphere by providing students with regular opportunities to meet as a group with him or her to discuss general operational problems of the classroom as well as problems of an academic nature.
- The students do not function under the stress of a pass / fail system, but determine with the teacher the standards to be achieved. They have a large say in the evaluation of their work.
- The teacher does not deal with unacceptable behaviour in the classroom in a punitive manner but rather follows a "natural-consequences" approach as far as possible, keeping in mind the safety of the students.
- The teacher is "open" with the students: there is no "game playing" with them (e.g., the asking of threatening questions for which the teacher already knows the answers). Each student's word is accepted as truthful, and the students are aware of this.
- The teacher talks *with* the students most of the time rather than *at* them, *listens* to them with interest and concern, and laughs with them at those small things that occur in every classroom from time to time.

Of paramount importance is the teacher's relationship with each student, who should feel worthy and cared for and not just a number on a class list. By creating this kind of classroom climate, the teacher truly invites learning to occur. He or she is then in a unique position to understand, through his or her observation of and interaction with students, the ways in which they learn best and to adjust his or her teaching

methods accordingly. The teacher's ultimate goal is to help students to take responsibility for their own learning (i.e., to become self-directed learners).

Teaching Approaches

Many of the learning difficulties experienced by students with learning disabilities are the result of teaching that may be appropriate for most students, but is inappropriate for them. Above all else, they require good teaching that takes into account their unique qualities. In other words, they require personalized instruction. This can be provided in remedial, resource, or special-class situations and through the assistance of peer tutors, volunteers, and teacher aides (as discussed in the preceding section).

Regular classroom teachers can help learning-disabled students by modifying their regular class programs in a number of ways. Some of these have already been discussed in the section on placement above. In general, the teacher must:

- be aware of the students' learning difficulties and of how and where they are exhibited;
- be certain that all prerequisite skills have been taught and mastered;
- ensure that the materials for each lesson are appropriate;
- make sure that additional aids required to supplement the lesson are available;
- ensure that time is allotted to evaluate the success of the teaching-learning activity.

Students who have trouble following instructions may be helped if visual (e.g., films, pictures, slides, drawings) or concrete materials (i.e., objects) are available to supplement the oral-lesson presentation. Instructions for follow-up activities can be written or printed on the chalkboard, on a

work sheet, or at the learning centre, so that students need not rely entirely on memory.

The provision of a few minutes at the end of a group lesson for the clarification of a concept or for a review of instructions may prevent ensuing difficulties for a learning-disabled student and can be accomplished while the rest of the group continues with the lesson's activities.

Other individualized procedures should also be considered. For example, the difficulties experienced by a student who cannot write as quickly as others and thus has difficulty with spelling and dictation can be alleviated if another student dictates the spelling or if the teacher tape-records the dictation and allows the student to play it back at his or her own pace. Even such a minor adjustment can be of great assistance to a learning-disabled student and will help to create an environment in which the student has a better chance to succeed.

The following subsections are designed to provide teachers with an overview of four teaching approaches that have been found useful with exceptional students, including students with learning disabilities. In each of the first three approaches teachers must:

- identify the need;
- specify the teaching objective;
- determine the student's readiness in relation to the objective;
- teach prerequisite skills;
- provide appropriate instructions and materials;
- determine how the student is to receive instructions (input) and how the student is to respond (output);
- adjust procedures to meet the student's needs;
- provide ample practice to ensure mastery or overlearning;
- evaluate their teaching in terms of the specified objective ("Has the student learned what I have taught?").

Diagnostic-prescriptive teaching

The aim of diagnostic-prescriptive teaching (DPT) is to deal with a student's learning difficulty by devising methods and materials to avoid or compensate for it. The theory underlying the DPT approach is that, although only the product of a learning disability is directly observable, it is caused by an underlying process deficit. In this context, *product* generally refers to such academic skills as reading, spelling, and so on, whereas *process* refers to the functioning abilities of the motor, auditory, visual, and verbal systems. As

indicated in this document, however, this conceptualization of learning disabilities is being increasingly questioned.

Adherents of the DPT approach seem to agree on four assumptions: (a) that students have strengths and weaknesses; (b) that these are a cause of their ability or inability to learn; (c) that student strengths and weaknesses are measurable; and (d) that teaching may be directed towards process deficits or towards manifested ability strengths and weaknesses. Although the DPT model assumes that it is possible to identify a student's best learning system (auditory, visual, motor) and learning style (verbalizing, tracing, etc.), research has thus far failed to support the assumption that process training by itself has a significant positive effect on the acquisition of academic skills.

Consider, for example, the student who reads haltingly. Though the problem indicates poor sight vocabulary, according to the DPT model this is the result of poor visual memory, and visual memory must then be considered the primary area of disability. The DPT approach thus seeks to develop overall visual memory rather than simply an improvement of sight vocabulary. Using this approach, the teacher might begin by showing a student a few concrete items on a tray, removing one item while the student is not looking, and asking the student to identify the missing item. As the student's ability to remember concrete objects improves, the teacher would then try shapes, then letters, numerals, and a sequence of two letters, building up to words. These would have to be identified among other words and finally written or printed from memory. Through this progression the attempt is made to begin the remedial process at the primary area of disability, broaden and relate it to other areas, and finally generalize it to the academic tasks of reading and writing.

Although this view of the teaching-learning process is now considered to be inadequately supported by empirical evidence, many aspects of DPT remain useful for teachers. Effective DPT consists of four parts:

1. *establishing objectives*, which in DPT are extensive groups of behavioural statements describing educational intents. Everything else in DPT relates back to this group of objectives;
2. *diagnosis*, which is the process of ascertaining which objectives the student has already reached and which he or she has not attained;
3. *prescription*, which is the process of describing activities that will lead to objectives as yet unattained;

4. *criterion measurement*, which is the process of determining whether the student, after completing the prescribed activities, has reached the intended objectives.

The foundation of DPT is informal assessment by the teacher or formal diagnostic assessment by a psychologist or diagnostician. Teachers may find the following modified DPT procedure useful:

1. Teach.
2. Observe and record:
 - a) the student's physical ability to meet the task demands;
 - b) the student's attitude towards the task and towards him or herself;
 - c) what the student does;
 - d) how the student does it;
 - e) how the student tries to compensate;
 - f) the student's errors.
3. a) Vary the task demands and analyse the student's errors.
b) Determine the student's readiness in relation to the sequential steps of the task.
c) Simplify the task and / or the objective, if necessary.
4. Provide appropriate conditions and materials.
5. Administer criterion tests to determine whether the objectives have been reached.
6. Reteach according to the specified objective and in relation to the above analysis.
7. Adjust the instructional procedures and shift the focus as necessary.

The success of the DPT approach depends on teachers' awareness of their students' learning difficulties and their own ability to analyse the difficulties and adjust their teaching methodologies and materials to meet student needs. It requires that teachers assess their own teaching on an ongoing basis so that they know when to move to the next step in the procedure or when to shift, if necessary, to a different approach.

Task analysis

Although task analysis is a component of the DPT model, its emphasis is different in that the concern is not as much with the process as with the task itself. While the DPT approach is concerned with observable skill deficiencies and assumes underlying process weaknesses, task analysis focuses directly on the skills required to complete a task. It is a technique that can be acquired by any teacher and applied to any instructional problem, regardless of the methodology. While it requires neither specific diagnostic instruments

nor the interpretation of sophisticated psychological reports, it does require a knowledge of what is involved in the task facing the student. The teacher must be aware of the input demands (how the student is to respond to the task) and observant of how the student handles the demands of the task. In addition to being aware of the demands, the teacher must know the student's readiness for the task (i.e., Has the student all the prerequisite skills to complete the task?). Last, and perhaps most important, the teacher must be able to break down the task into its smallest units and to arrange these units into a sequence, beginning with what the student already knows, so that the student accumulates, in a spiral fashion, little bits of information until he or she has learned, mastered, and overlearned the task.

Teachers should be familiar with the following four steps of task analysis: setting behavioural objectives, establishing the student's entering behaviour, setting the instructional procedure (sequential steps), and assessment.

Step 1: Setting behavioural objectives.

Since the task-analysis technique is concerned with treating one specific task in detail, the first step is to define the objective, specify the aim of the lesson(s), and define precisely what the student will be able to do as a result of instruction. For example, the behavioural objective might be as follows: "The student will be able to print, from dictation, twenty three-letter words containing the short vowel sounds /a/ , /o/ , and /i/ with 90 per cent accuracy."

Step 2: Establishing the student's entering behaviour.

The entering behaviour is the student's readiness for a specific task. To determine the student's readiness, the teacher must analyse what the student knows and does not know in relation to the behavioural objectives that have been established. To do this, it is necessary to list sequentially the skills required to reach the objective and to determine the point in the sequence that the student has already reached. For instance, the following skills are basic to the sample objective specified in Step 1 above:

1. to identify letter names;
2. to discriminate letter symbols (*b-d, m-w, m-n, n-u, p-g*, etc.);
3. to identify letter-sound relationships;
4. to discriminate consonant sounds (*/b/ - /p/ , /d/ - /t/ , /m/ - /n/ , /f/ - /s/ , etc.*);
5. to print the letter when given the name;
6. to print the letter when given the sound;

7. to discriminate the vowel sounds /a/ , /o/ , and /i/ as in *pat*, *pot*, and *pit*; and to associate the sounds with the letter symbols *a*, *o*, and *i*;
8. to hear the sequence of sounds in a three-phoneme word such as *pat*, *pot*, or *pit*;
9. to hold in memory the order of the sounds;
10. to print the letters for the sounds in the correct order.

By using a checklist the teacher may find that the student has mastered the first six skills in the sequence. This would indicate the student's entering behaviour.

Step 3: Setting the instructional procedure (sequential steps). Having determined the entering behaviour, the teacher must then examine those subskills that should follow systematically and that the student must master in order to meet the behavioural objective. Using the entering behaviour as the starting point, the teacher should then proceed with tasks arranged sequentially, allowing the student to master subskills of increasing difficulty. The student's degree of learning disability will determine how much can be accomplished in each lesson. Although the tasks are arranged sequentially, it does not necessarily follow that each subskill will be accomplished in each lesson, or conversely that a lesson will be required for each subskill. A student with a specific learning difficulty may require three or more lessons to master one subskill, whereas a gifted student with no difficulty may master four, five, six, or more subskills in one lesson. Since each subskill must be mastered before the student can proceed to the next in the sequence, the teacher must rely on ingenuity and creativity to keep the lessons interesting and the student motivated. The instruction should be so precise and effective that mastery of each successive skill in the instructional sequence is within the student's reach. In the example used above the next skill would be number 7, which requires the discrimination of the short vowel sounds /a/ , /o/ , and /i/ and the ability to associate the letter symbol for each sound. The following are the subskills to be mastered at this stage:

- a) to discriminate the sound /a/ in *pat*, *tap*, *map*, *cat*, and so on;
- b) to discriminate the sound /o/ in *pot*, *top*, *mop*, *cot*, and so on;
- c) to differentiate the sound /a/ from the sound /o/ in *pat*, *pot*, *tab*, *cob*, *not*, *tan*, and so on;
- d) to discriminate the sound /i/ ;
- e) to differentiate the sound /i/ from the sound /a/ ;

- f) to differentiate the sound /i/ from the sounds /a/ and /o/ ;
- g) to associate the letter symbol *a* with the sound /a/ ;
- h) to associate the letter symbol *o* with the sound /o/ ;
- i) to associate the letter symbol *i* with the sound /i/ ;
- j) to print the letter symbol *a* when the sound /a/ is heard;
to print the letter symbol *o* when the sound /o/ is heard;
to print the letter symbol *i* when the sound /i/ is heard in words such as *pan*, *pin*, *tam*, *rob*, *pal*, *tip*, and so on.

When the student has mastered each of these subskills, the teacher may then proceed to instructional skill number 8, similarly broken down into subskills.

Step 4: Assessment. Assessment refers back to the behavioural objective, which is, in the example used, "to print from dictation twenty three-phoneme words containing the short vowel sounds /a/ , /o/ , and /i/ with 90 per cent accuracy." Since the purpose of assessment is to determine whether the student has learned what the teacher set out to teach, the teacher must not give any clues in the form of facial expression, gestures, or voice tone to indicate whether a student's response is correct or incorrect. To be certain that the student has mastered what the teacher has taught, the student must reach the objective on his or her own. Assessment takes place at each step in the instructional sequence in order to provide mastery and overlearning of each component necessary to the achievement of the ultimate behavioural objective.

Precision teaching

Precision teaching is directed to the improvement of one specific behaviour at a time. The objective of this strategy is to develop mastery and to provide for overlearning. The following are the four basic component steps in the precision-teaching technique:

Step 1: Pinpointing the behaviour. Through the analysis of a student's errors, coupled with observations of what the student does as he or she works, the teacher can pinpoint the behaviour that is preventing the student from successfully performing a specific task. Suppose, for example, that the student has difficulty sounding out simple words. A quick check of the

student's sound-symbol associations may indicate that the student does not know all of the sound-symbol relationships.

Step 2: Setting appropriate aims. The appropriate aim of the above example is that the student be able to cite all of the sound-symbol correspondences immediately and accurately in random order and in upper- and lower-case form. Since precision teaching is based on time as a unit of measurement, the number correct within a specified time period would be the criterion of success.

Step 3: Setting the measurement units. In order to develop an appropriate measurement unit, data must be collected from students of the same age or grade who perform the task well. If this group can give letter-sound relationships at an average rate of fifty-five per minute, this then would be an appropriate standard for the student. To know how much the student needs to improve it is also necessary to gather baseline data on the student's present performance. This is obtained by taking three one-minute samples of the behaviour. If the baseline is twenty-five letter sounds per minute, this indicates to the teacher the extent of improvement necessary to reach the desired level.

Step 4: Charting daily progress. The student might make his or her own chart, numbering it from twenty to fifty-five, and each day record the number correct within the one-minute period. This visual representation provides the student with immediate feedback and reinforcement when progress has been made. The activity should be continued daily until the student has reached the standard that indicates mastery.

The teacher must *specify* how the objective is to be accomplished. In this example, is the student to have his or her set of letter cards? Is a letter card to be turned over as the sound association is given? Does the student have to write the letter symbol as the sound is given? Must the student say the sound as he or she points to it on a printed work sheet?

The teacher must also arrange the instructional sequence from easy to difficult. In this case, the sequence might be as follows:

- The student says the sounds for the upper-case letters in alphabetical order.
- The student says the sounds for the upper-case letters in random order.
- The student says the sounds for the lower-case letters in alphabetical order.
- The student says the sounds for the lower-case letters in random order.

- The student says the sounds for mixed upper- and lower-case letters in alphabetical order.
- The student says the sounds for mixed upper- and lower-case letters in random order.

When preparing the sequence, the teacher must be certain that the student has learned all of the prerequisite skills. For example, the student must be able to recognize and name each of the letter symbols.

In the activity the student touches the letter symbol and gives the sound as the teacher watches and records the errors. The student then counts the number of correct responses and records the number on the chart. The teacher can use the error or omission list for teaching purposes.

Although the preparation of letter cards, activities, and work sheets may seem time-consuming, a teacher can quickly develop a library of such materials for future use. Because the technique is so simple and precise, it is one that may be handled by a volunteer or even a senior student. The one-minute time frame makes it possible for a teacher to include the activity on a daily basis.

Task groups

The purpose of task groups is to provide opportunities for learning-disabled students to learn how to function co-operatively with others in discussion, research, and role playing. The following nine different types of task groups are suggested:

1. **Group-talk model.** This type of task group focuses on a specific question (e.g., 'What would it be like if people could read each other's thoughts?'). The teacher starts by asking for a clarification of the question to ensure that everyone is thinking along the same lines. The ensuing discussion can be tape-recorded and discussion points can be summarized. The participation of all group members can be evaluated while listening to the tape recording.
2. **Tutorial group.** This type of task group is appropriate for many purposes. The smallness of the group permits all members to become involved. As well, the teacher can assess the understanding of each participant quickly on the basis of his or her oral responses.
3. **Discussion group.** This co-operative grouping provides an effective way to approach any classroom, community, or national issue. A leader should be identified, as well as one student to critique each member's participation and to sum up the group's recommendations.

The teacher is totally involved in the group process.

4. **Investigative group.** This type of task group is appropriate for undertaking and completing a systematic investigation of a research problem. Students work together over several days or weeks to solve a problem or complete a project.
5. **Creative-analysis group.** This type of group is appropriate for examining a controversial or emotionally tinged issue. The teacher plays an indirect role by avoiding the role of “information bank” and challenging the students to create their own “information banks”. Students are encouraged to use questions to develop a content idea or to establish a proposition. The use of creative analysis teaches participants how to be more rational in handling the controversial and often shows students that certain problems have no “correct” answers.
6. **Open-discussion group.** This type of group is appropriate for teaching the fundamental skills of taking turns, listening attentively, and staying on topic. Students are involved in clarifying their own points, solving problems, finding out what others think, and re-evaluating their opinions. They learn how much they utilize “masks” in dealing with people. The group leader can assist by playing the “devil’s advocate” – presenting analogous situations, suggesting alternative interpretations or possibilities, and challenging assumptions.
7. **Assigned-roles group.** This type of group is appropriate for exploring “life” relations through discussion based on insights generated by role playing. Students play assigned roles and become involved in heated interaction. This leads to behaviour sequences that can be analysed. Through their experience students learn the value of listening to other points of view.
8. **Value-clarifying group.** In this type of group students learn to clarify their own values and to understand the disparate views of others. Based on a “What do I really believe?” approach to reality, the value-clarifying-group approach lays the groundwork for discussions of philosophies and lifestyles.

9. **Classroom meetings.** These can be used to alter inappropriate behaviours and to develop responsibility. Meetings can deal with the social behaviour of the group’s members, subjects important to the group, or teaching-learning activities.

The characteristics of a successful classroom meeting are as follows:

- It should be a regular part of the class curriculum.
- All problems relative to the class as a group and to any individual in the class should be eligible for discussion.
- Discussion should be directed towards solving a problem, rather than punishing or fault finding. This idea should not deter people from discussing how someone’s actions affected them and what the consequences of those actions may be.
- The teacher, but not the class, should be non-judgemental.
- The seating should be arranged in a circle.

Under ordinary conditions students sometimes find that the problems that arise in getting along with each other are hard to solve. Without help, students may tend to evade these problems, lie their way out of situations, depend on others to solve them, or just give up. The problem-solving classroom meeting can help them to find better ways to solve their problems and to develop a positive feeling of self-discipline and responsibility. It usually takes a few meetings for the teacher and students to become comfortable about the discussion of class and individual student problems.

Students will often bring up topics and questions that concern them. The following are some that come up on a regular basis: loneliness, truancy, fighting, stealing, friendship, vocations, kindness, academic subject topics, hobbies, laws and crime, sports. Students might also enjoy discussing the following questions:

- How do you make friends?
- What makes a good friend?
- What do you do when someone new moves into the neighbourhood?
- Should people all wear the same clothes?
- If you had a million dollars, what would you do with the rest of your life?
- If you had the power to change into a wild animal, what animal would you change into?
- What should we do with students who are in trouble?
- What would you do if you were lost in a desert? jungle? If you were shipwrecked?
- What would you do if you were given a house?
- What is the difference between a boy and a monkey?
- What would happen if everyone in the world turned green?

Organizing the Classroom to Accommodate Students With Special Needs

The need to accommodate the varying interests and capabilities of individual students has been discussed for many years. Since individualization is limited considerably in classrooms in which the teacher regularly instructs all of the students on the same topic in the same way and at the same pace, alternatives should be considered. The following model was developed by E. Pipher² to both individualize and integrate the curriculum at the Grade 6 level. The program was organized so that each student would:

- develop such positive human attributes as integrity and understanding and consideration of others;
- learn by doing at his or her own pace;
- learn how to organize his or her time;

- develop both independence and interdependence;
- learn to combine freedom with responsibility;
- relate learning to the "real" world;
- build up his or her self-confidence and sense of worth;
- learn the basic skills (including the skills of making decisions and doing research);
- integrate the subject areas (language, mathematics, science, social studies, health, and the arts);
- learn in an atmosphere of acceptance and trust.

In order to accomplish these goals Pipher organized a program that minimized students' dependence on instruction by the teacher. The amount of time that students would have required if they all had been studying the same topic at the same time and at the same pace was reduced significantly.

The classroom was organized so that students would have considerable freedom to choose what topic to study and when to study it. While they were expected to take considerable responsibility for their learning, they were also expected to master the usual required concepts and skills.

The program did not cover all subjects and operated only in the mornings. The developmental aspects of language, physical education, music, and art were taught by another teacher in the afternoons. However, the model is as applicable to a full day as it is to a half day.

In launching this program Pipher started the students off by telling them that after two weeks of observation he would divide them into three groups *according to how well they could work on their own*. The groupings would have nothing to do with academic capabilities. They would be based on how well each student could work without disturbing others, meet deadlines, and produce results concomitant with his or her ability. After two weeks the following groups were established:

- maximum freedom group (maxis)
- medium freedom group (midis)
- minimum freedom group (minis)

2. E. Pipher, "Organizing the Classroom to Accommodate Students With Special Needs" (unpublished monograph, 1983).

Because a third of the students had demonstrated that they could work independently (maxis), they were given considerable freedom to move in and out of the classroom and within it. In contrast the minis had to get permission much more frequently and were given considerably more direction as to when their activities should take place.

Students were told that a much better learning situation would exist when all were in the maxis. The teacher promised to help each student move into the top group. By mid-October all the students had moved into the maxis and remained there for the rest of the school year. The students liked this "freedom-with-responsibility" approach so much that any suggestion to a student that a change in grouping might be necessary (because, for example, too many deadlines were being missed) prompted a significant change in behaviour.

The teacher felt that giving each student as much freedom as he or she could take responsibility for was much superior to indiscriminately giving all students excessive freedom (since this tends to lead to chaos) or, on the other hand, restricting all students because of a few students

who might not be able to assume responsibility at first for their own learning.

The program operated in the following way. Some of the students prepared a partially blank timetable (see figure 1) on each Friday for the following school week. All of the students were expected to do what appeared shaded on the timetable. In the example in figure 1 the students knew that there would be a discussion session involving the entire class from 9:00 to 9:30, Monday to Friday. This discussion would include what the students wanted to share from the weekend as well as plans for both the day and the week. A brief discussion at 11:50 was scheduled to sum up the morning's activities.

Anything appearing on the timetable at 12:00 indicated the deadline for items that were required at that time. In the example given, the students would know that two mathematics activity cards were due on Tuesday, a map exercise on Wednesday, and personal journals on Thursday.

As the week progressed, additional items were added to the timetable. Any shaded items added were required of all students. Any unshaded items indicated that the activities were either optional or required of certain students. Blank

Figure 1

PARTIAL TIMETABLE

Shaded – Designated activities for all students
Unshaded – Student-selected activities for which they are accountable (see figure 3)

Time	Monday	Tuesday	Wednesday	Thursday	Friday
9:00	Discussion	Discussion	Discussion	Discussion	Discussion
9:30	TV Fractions		W.I.G.		
10:00	110	130	130	110	80
10:30					Talkabout
10:50	RECESS				
11:00		Math Enrichment		Math Enrichment	Math Test
11:30					
11:50	REVIEW OF THE MORNING				
12:00		2 Math Activity Cards	Map Exercise	Personal Journals	

W.I.G. – Writing Improvement Group

spaces indicated time available for students to select from among the dozen or so other areas of work in the program.

Figure 2 shows a completed timetable. Decisions to insert items in the timetable resulted from discussions between the teacher and students.

The amount of shaded time could vary from week to week. In figure 2 the amount of "choice time" averaged sixty-five minutes per day, while in figure 1 an average of two hours per morning was available for the students to choose areas of work.

The activities in figure 2 need some explanation. Students in W.I.G. (Writing Improvement Group) were students whose penmanship was not at an acceptable standard and who required

further instruction and practice. The TV program *Time* was not shaded, since it was somewhat advanced and not all students would profit from it. Only a few students chose to go, and they later shared what they had learned with the rest of the class. Mike and Jimmy were making homemade musical instruments for the afternoon music classes, so they chose to see a related TV program at 11:00 on Tuesday. During the unshaded time periods the teacher was available to work individually or in groups with students, to supervise various activities, or to interview students. At any given time indicated by a blank on the timetable students individually, in pairs, or in small groups might be working on any of the following activities.

Figure 2

SAMPLE TIMETABLE

Shaded - Designated activities for all students
Unshaded - Student-selected activities for which they are accountable (see figure 3)

Time	Monday	Tuesday	Wednesday	Thursday
9:00	<i>Discussion</i>	<i>General Discussion</i>	<i>General Discussion</i>	<i>Opening Exercises</i>
9:30	<i>TV - UFOS Discussion</i>	<i>Math Discussion</i>	<i>Math Problems</i>	<i>W.I.G.</i> (40 min)
10:00	<i>Math Problems</i>	<i>TV - Whole Numbers</i>	<i>Group M</i>	<i>TV Equivalent Fractions</i>
10:30		<i>TV Discussion</i>	<i>TV Discovery of Rubber</i>	<i>Maple Lane</i> TV Production
		<i>TV Time PT. II (90 min)</i>	(60 min)	
			<i>TV Growing Up</i>	Enrichment
RECESS				
11:00	70 min	<i>Mult.-Levels Test</i>	<i>County Quiz</i>	General Discussion
		<i>TV Musical Instruments (Mike - Jimmy)</i>		Survey of Themes
	<i>Short Division</i>		<i>Workshop (Insurance)</i>	<i>Math Problems Test</i>
	<i>W.I.G.</i>	<i>Extra Help - two-digit divisors</i>	<i>Discussion - News</i>	
12:00	REVIEW OF THE DAY			

W.I.G. - Writing Improvement Group
Group M - Special Work Group

- Class theme. Several integrated class themes were studied during the year. While the theme was the same for all students, individual students worked on various aspects of the topic.

- Independent study. Individual students selected, with the teacher's approval, any topic of interest in social and environmental studies. They all used the following structure (called SCOPE) in pursuing their topics:

- a) Select the topic and submit it for approval.
- b) Collect the data.
- c) Organize the material.
- d) Present in one of many possible ways.
- e) Evaluate with the assistance of other students, parents, volunteers, and the teacher.

At any time, individual students would be at various stages in their research but could indicate the stage fairly easily using the above scheme.

- Personal journal. The students were expected to express their feelings on any topic related to themselves or the world around them. This was shared on an individual basis with the teacher only.

- Mathematics workshop. The students chose activity cards from a selection provided in geometry, measurement, number patterns, and so on. Records were kept and were available to the teacher who could see that a "balanced diet" within the various areas was maintained. These activities supplemented other aspects of the mathematics program.

- Extra-help sessions. These individual or group sessions could be requested by either the teacher or the student.

- Mathematics enrichment. Various activities were provided for students who could profit from them.

- Games. Games involving mathematics, science, or language were made available for selection by the students.

- Experiments. The students, individually or in groups, selected a problem for investigation and submitted it for approval.

- Incidental problems. These problems arose from actual situations and were suggested by the teacher or the students. For example, one boy calculated how much water would be wasted each week by a leaky tap that awaited repair in the boys' washroom.

- Health activities. The students (in groups) listed questions about which they were curious related to physical and emotional health. Under the guidance of the teacher and assisted by a parent volunteer who was a nurse the questions were organized into related topics for investigation.

- W.I.G. (writing improvement group). This session provided assistance for students whose penmanship was below an acceptable standard.

- TV / films. These films or TV programs were watched by some students who were then required to report on them either orally or in written form.

- Mathematics exercises. These were additional activities not included in the workshop cards or in the developmental mathematics program.

- Other work. This simply provided for any items not classified in any other activity. It included situations where a student helped another in some area of the curriculum.

- Interviews / evaluation. These sessions involved interviews with the teacher or assessment sessions that involved student, peer, and teacher evaluation.

- Duties. Students were divided into committees of three to help them learn how to make decisions as a group. Each committee was responsible for three class activities, such as filing samples of students' work, preparing certain sessions, and preparing the blank timetables.

Each day the students were required to account for all of their unshaded time. This was done in their two weeks' daily log (see figure 3).

Students recorded the accountable time along the top and estimated the time spent on each activity. The total along the bottom was compared with the time expected. Any work done at home would make the actual time higher than the accountable time.

The students were not expected to work on each activity on any given day but were expected to have a "balanced diet" in a two-week period. This was indicated by the "Total" column (figure 3). A reasonable amount of time spent on the various activities was expected. Each student was asked to make comments about the activities. The teacher made suggestions to help students with any area in which work was slipping.

Figure 3

Daily Log _____ to _____ NAME _____

Date															
Activity Time	70	90	60	40	90	350	110	130	130	110	80	560	910		Comments
Class theme	30				40	70	40					40	110		
Independent study		40	30			70		60	130	30	40	260	330	I'm almost finished.	
Personal journal		10				10				15		15	25		
Mathematics workshop	20				30	50					20	20	70	I need more time.	
Extra help		10				10		20				20	30		
Mathematics enrichment		20	20			40		30		30		60	100	This is fun.	
Games					10	10							10		
Experiments				40		40	40				40	80	120	I wasted some time.	
Incidental problems															
Health activities							40	10				50	50	I don't enjoy this.	
W.I.G.															
TV / Films		20				20	20			15		35	55		
Mathematics exercises															
Other work										10		10	10		
Interviews / evaluation	10					10	10		10		20	30			
Duties	10		5		10	25		10		10		20	45		
TOTAL	70	100	55	40	90	355	150	130	130	120	100	630	985	Independent study was heavy.	

Students liked the opportunity to decide on the areas in which they would work on any given day. They soon realized that in order to continue having the privilege to do this they had to be organized, set priorities, and be sure that deadlines were met.

The teacher did not have to be constantly giving out work or to be particularly concerned about what individual students were doing at any given time; the time of accountability came later. Because of this the teacher could work with students of a wide variety of capabilities and interests, either individually or in groups, and could get to know each student very well on an individual basis and modify programs based on that knowledge. Students could also help each other.

Students had considerable choice in selecting areas for study, but the basic skills of learning were not optional. In other words, whether they studied First World War flying aces or deep-sea diving, they used basic research skills. Since problems selected by a student for independent study or for experimentation had to be approved by the teacher, an overall balance of topics could be maintained.

This approach to the organization of programs can have many variations. The amount of shaded and unshaded time can be varied significantly. The method of accountability by the student for time spent may be simplified for younger students. The choice of content may also be modified or restricted if the teacher so desires.

It was found that this organization facilitates the implementation of a program that attempts to accommodate the needs and interests of individual students with wide variations in abilities. It also provides many opportunities for the teacher to work with students individually and in groups. Since not all students are working on the same topic at the same time, less equipment and fewer resource books are required. Of great value is the fact that a teacher can get to know each student very well and can learn a great deal about each student's ability to organize time, work independently and in groups, select areas of study and be accountable for work choices, and set priorities.

Uses of the Microcomputer

The widespread use and increasing refinement of microcomputers is effecting changes in the ways in which learning-disabled students are being taught. Since the microcomputer can assist

these students in basic operations (e.g., sorting data, arithmetic computation), the student is freer to develop higher-level skills. Thus, a "partnership" between learning-disabled students and the microcomputer enables students to engage in creative writing while using word-processing and spelling-correction programs and to undertake simulation activities that stimulate higher-level thinking skills.

While it has been argued that computer-assisted-instruction applications do not represent the most creative use of microcomputer capabilities, evidence suggests that such applications are particularly effective with exceptional learners who require a great deal of drill to master rudimentary concepts. The following are some of the advantages that microcomputers offer:

- spontaneous feedback
- repeated trials
- individualization of content and pace
- interaction with the student
- continuous evaluation of the mastery level and the understanding of the student
- a consistent format in presentation, application, reinforcement, and evaluation
- motivation

Microcomputers are used in three main ways in education: as an object of instruction (i.e., learning about microcomputers and how to use them), as a medium of instruction (i.e., learning curriculum content through microcomputers), and as a catalyst of instruction (i.e., using microcomputers as a tool to increase the rate of learning). Although microcomputers make very poor principal teachers, they can make outstanding teaching assistants. Thus, successful microcomputer applications are not a reflection of microcomputer power but rather of the skill of the teacher, who determines how best to harness the microcomputer's capabilities in the service of his or her students.

The advantages of using microcomputers with learning-disabled students were substantiated by a recent study conducted at the Trillium School in Milton, in which teachers and learning-disabled students became involved in using the microcomputer in the classroom setting. The rest of this subsection presents some of the findings of the study.³

The general reaction of the students in this project to the microcomputers was overwhelmingly positive. The most frequent request on the

3. Summarized from Peter H. Lindsay and Anthony E. Marini, *Microcomputers and Exceptional Children: Releasing the Potential* (Toronto: Ontario Institute for Studies in Education, 1983).

part of the students was for more time on the systems and for more systems. Teachers reported that microcomputers were most effective with the following types of activities:

- basic computational drills (addition, subtraction, multiplication, division);
- drills in some of the mechanics of written-language skills (e.g., spelling drills for awareness of letter sequences, spelling rules);
- tutorials in all areas of the arithmetic curriculum from Kindergarten through Grade 8;
- creative-writing exercises through the use of word-processing programs;
- designing and programming graphics on the computer, both in the BASIC language and in LOGO.

The most effective use of the microcomputer as a tool has involved the word-processing programs that are available on most microcomputers. These programs were used most effectively in the project in the teaching of creative writing. A writing system that permits effortless editing and eliminates evidence of previous errors holds a great attraction for many learning-disabled individuals.

Students who reportedly had never written a composition of any kind wrote their first stories using the microcomputer.

Many of these students possessed poor handwriting and spelling skills that had previously acted as a barrier to their participation in creative-writing classes. An opportunity to produce a clean and perfectly typed text was a unique experience for them and undoubtedly played a role in the popularity of this microcomputer application in the project.

Students not only added to the length and quality of their compositions in terms of organization and content, but they also voluntarily engaged in the writing process more frequently. A few students who showed little enthusiasm for the traditional writing system were composing with the microcomputers on a daily basis, often on their own time.

One of the most surprising aspects of the project was the number of learning-disabled students who developed programming skills. Given the required precision of spelling and syntax that programming requires, an early prediction was that very few learning-disabled students would show any interest in or aptitude for programming. This prediction proved to be incorrect, however. In fact, the students' desire to learn computer languages was so great that the mathematics teacher developed a specific programming course for them.

The inclusion of programming in the microcomputer activities motivated students to develop an additional set of skills, including spelling, proofreading, mathematics, typing, logical thinking, and problem solving. Previous to encountering the microcomputers, many of these skills had little relevance for these students. However, enthusiasm to control the microcomputer and develop programming skills, combined with the microcomputer's distaste for spelling, syntax, and logical errors, made many of these skills essential. For several individuals it was the first time that they truly appreciated and were sufficiently motivated to learn essential skills in such areas as reading, spelling, and mathematics.

The project team made several interesting observations. The mathematics teacher reported that students developed geometric concepts much more readily when working with LOGO as opposed to traditional instruction. For example, the concept of angle, which many students fail to grasp in classroom instruction, seems to be assimilated easily when using LOGO. Users can create procedures for drawing squares, triangles, and circles with relative ease and without the need to memorize abstract formulae. With LOGO the mechanics of language are no longer barriers to exploring central concepts in mathematics.

In addition to advances in traditional academic areas, many students displayed significant developmental gains in important affective areas such as interpersonal interactions, respecting the rights of others, respect for property, and the development of self-confidence and a positive self-regard. In fact, perhaps the most pervasive overall gains were in the area of self-concept. The relationship of microcomputers and positive self-concept rests on what many of these students perceive as a paradox. They are aware that society has often associated computers with bright individuals, while many of these students regretfully view themselves as incapable of learning. As their computer skills develop, however, they begin to recognize that they are succeeding in an area that society considers important. Thus, their negative self-image is no longer compatible with their successful performance.

Change was also observed at the group level. Contrary to the notion that computers promote isolate or anti-social behaviour, teachers reported that group problem solving was a frequent occurrence. Whether the task involved debugging a basic program or developing a LOGO procedure, students freely expressed their opinions, tested their hypotheses, and revised their thinking, taking into account information received from both their peers and the video screen.

As a result of a number of the students' developing computer skills beyond those possessed by

the teachers, these students on occasion served as instructors, creating a reversal of the traditional student-teacher relationship. This form of interaction was of particular value to those learning-disabled students who in the past felt that they had little to contribute to their own educational process.

Special educators have long recognized that technology can be used to maximize the development of handicapped individuals. The results of the project clearly demonstrated that microcomputers can play a valuable role in the development of both cognitive and social skills in learning-disabled students. Given the field's openness to technical innovation, the next few years will likely see a rapid increase in the number of computer applications in all areas of special education.

Some Cautions Regarding the Use of Non-Educational Interventions

Although the contributions of medicine and psychology, as described below, may be useful when applied in special cases, the teacher's role is educational. In many instances a carefully designed and implemented educational program can do much to modify a student's undesirable behaviour. Non-educational interventions should only be explored when, even after the best teaching, the student's behaviour is such that he or she is consistently unable to function appropriately in the classroom. Drug interventions in particular should only be used as a last resort and restricted to those learning-disabled students with severe attentional difficulties and associated hyperactivity.

Medical management

Medical intervention has traditionally been one of the means of treating the symptoms of learning disabilities. The medical diagnosis of "hyperactivity" is closely associated with learning-disabled individuals, but since it is not exclusively a symptom of learning disabilities, medical approaches are controversial. Though chronic overactivity or lack of impulse control may be neurological in origin, such behaviour must be distinguished from that of the highly energetic student. In other words, if medical treatment is to be instituted, it must be reserved for the student who is hyperactive as a result of

a learning disability. It is not appropriate for the overactive student who simply represents a discipline problem. Even for the hyperactive learning-disabled student there is considerable dispute as to whether medical approaches significantly improve learning ability, although they have been used widely with those difficult-to-manage learning-disabled students who exhibit restlessness, impulsiveness, and distractibility to a high degree (attention-deficit disorder).

Medical research and management have concentrated primarily on the following three specific areas:

– **Drug therapy.** Perhaps the most frequently prescribed treatment in the management of hyperactive children is stimulant medication, such as methylphenidate (Ritalin), pemoline (Cylert), or *d*-amphetamine (Dexedrine). Paradoxically, these medications, administered in appropriate dosages, have been found effective in increasing the ability of hyperactive children to attend. However, there is so much controversy regarding the uses, abuses, and effects of drug therapy for overactive children that the decision to use this approach should only be made after careful deliberation and consultation between the student's parents and doctor. Two factors are essential in the administration of drugs to control behaviour. First, the physician must monitor the dosage and the effects of the drug on the student's physical health, sleep, and growth patterns. Second, teachers and parents must make careful observations in order to provide data to assist the physician in the determination of the frequency, amount, and duration of the medication.

– **Nutritional dietary control.** Another form of medical management is that related to nutritional and dietary control. In recent years many studies have investigated the relationship between nutritional and dietary factors and hyperactivity in students. The results of several such studies indicate that there is an increased frequency of allergic reaction to certain foods in hyperactive children. At present, perhaps the most widely known diet is that of Feingold,⁴ which eliminates "all artificial food colours and flavours as well as food with a neutral asalicylate radical (almonds, apples, apricots, cucumbers, oranges, strawberries, tomatoes)". Although there is no evidence that any natural or artificial foods, or any other specific environmental influences, can cause learning disabilities

4. B. F. Feingold, "Hyperkinesis and Learning Disabilities Linked to the Ingestion of Artificial Food Colours and Flavours", *Journal of Learning Disabilities* 9:9 (1976), pp. 551-59.

or attentional-deficit disorders in normal children, it seems certain that additives (e.g., red food colouring) and other negative environmental influences exacerbate these conditions in children.

- Orthomolecular management. Another form of medical management is that known as orthomolecular medicine. It is based on the premise that megavitamin treatment decreases hyperactivity and improves the learner's concentration and attention span. For this reason orthomolecular medicine is used by some as an alternative to drug treatment for hyperactive children.

As with any approach to behavioural or learning difficulties, the advantages and disadvantages of each of drug, nutritional, and orthomolecular therapies must be carefully weighed by the appropriate professionals before a program is initiated. In doing so, alternatives must be carefully examined. One such alternative that is in common use is behaviour modification.

Behaviour modification

Behaviour may be modified in different ways. One is operant conditioning, in which the student is rewarded frequently or at specific intervals for

desired behaviour. In this regard a tangible reward has been found to be more effective than the reward of free time. Lesson length may also be used to produce appropriate student behaviour. A variety of short, intensive activities is usually more successful than using the same amount of time on one activity. This type of program requires a high degree of organization on the part of the teacher: teaching materials must be well organized and immediately available and activities must be interesting, meaningful, and applicable. A third approach is a self-regulation technique in which students are taught to use subvocalized speech to control their behaviour. Another technique is biofeedback, such as muscle relaxation through breathing control, coupled with positive verbal feedback. Each of these four techniques of modifying behaviour is well within the realm of any special education teacher.

Behaviour modification has been attacked as a manipulative, mechanistic approach to the management of student behaviour. However, many of the techniques used in this approach have been employed naturally by teachers for generations. It is the conscious analysis and identification of behaviour modification as a "behaviour management approach" with rigid rules and procedures that is often difficult for teachers to accept.

Specific Teaching Strategies

Because learning-disabled students do not respond to usual teaching techniques, teachers may feel bewildered and unsure in handling them. Thus, many teachers want explicit, step-by-step directions to follow in working with a student who has difficulties. Furthermore, they want the directions written down in a clear, precise manner so that they have them to refer to. The following suggestions are provided to assist teachers in some of the areas in which students with learning disabilities commonly experience difficulties.

General Language Activities

Multisensory techniques

In the following activities the student should work with two special words or letters during each of the initial sessions. The teacher should check on these at the next session. If the student can read and write them from memory, two more can be attempted. Eventually the student will be able to tackle three, four, or more words at a time.

1. A Dolch word or an alphabet letter is provided on a small card for the student to copy from. The student then rolls out a piece of clay until it is long and thin, forms each letter from the clay, and then traces each clay letter with the forefinger of the hand that is used to write with, pushing down hard into the clay and saying the letter aloud. In the case of a Dolch word, the student says the whole word aloud once the letters have been traced and said aloud.
2. A word or letter is written on the chalkboard using the broad side of the chalk. The student

then traces the word or letter on the chalkboard using his or her forefinger and saying each letter and then the whole word until the chalk disappears.

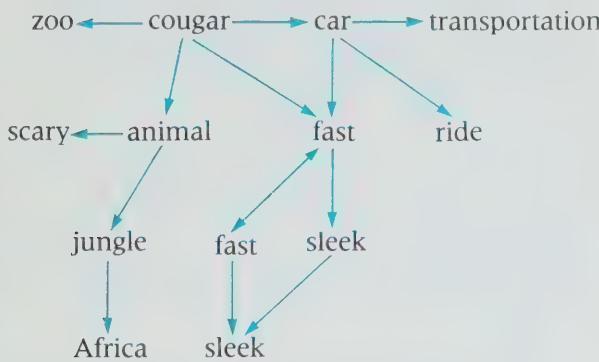
3. The student attempts to write a designated word or letter on paper. He or she then dictates a sentence with the word in it to the teacher, who writes it out for the student to copy. The student should keep a file of these, either in a notebook or on cards.
4. The teacher uses his or her forefinger to trace a letter or Dolch word on the student's back between the shoulder blades. Each letter and then the whole word are repeated five or six times, while the student, with eyes closed, listens to and feels the tracing of the letters. The student then immediately writes the letter or word five or six times, saying the letter and then the whole word each time. If the student seems to get stuck, the teacher can prompt him or her by saying, "Think how these letters felt on your back."

Expanding and strengthening receptive and expressive vocabulary skills

The following activities can be integrated with reading and writing as appropriate. Care should be taken to ensure that any written materials contain reading vocabulary that students already have within their repertoire.

1. The student listens to a word and brainstorms to come up with items or concepts associated with it (e.g., *sour* – vinegar, lemon, and so on; *carpenter* – wrench, building, and so on). Divergent responses and explanations should be encouraged.
2. The associations that are made during the previous activity can be mapped out on paper

or the chalkboard to illustrate how word concepts interrelate. For example:



3. Fifteen or twenty objects are placed in a box. The student sorts them into categories. The student can think up his or her own categories, or categories can be suggested (e.g., categories suggested by the materials from which the objects are made – rubber, wood, plastic, etc.).
4. The student listens to or reads a word and tries to think up a word that means the same thing (e.g., *angry-mad*).
5. The student listens to a sentence and is asked to replace a target word with a synonym from a choice of two or three (e.g., John is very *angry* – mad, happy, funny).
6. The student listens to a sentence and is asked to state whether the second sentence means about the same thing (e.g., The man shouted at the woman; The man yelled at the lady). Pairs that are different in meaning should be used as well.
7. The student listens to a pair of sentences containing a target word with a dual meaning and is asked to state whether the word means the same thing in each sentence. A discussion about the different meanings can follow (e.g., He was feeling *blue*; I have a *blue* car).

Co-ordinating oral vocabulary with sight words

The following activities can be modified in a variety of ways (e.g., paper-pencil tasks, picture cues).

1. Categories such as games, animals, and tools are listed on a work sheet, with or without picture cues. The student reads or listens to words printed on cards and places the cards in the appropriate categories. New sight vocabulary as well as previously learned words can be included.

2. The teacher flashes “sight” words or picture cards, and the student is asked to pick out all of the words belonging to or associated with a topic or category (e.g., sports category: hockey, bat, doll, cup, tennis).
3. The student reads or listens to a group of words and selects the word that does not fit in the group (e.g., *wink, sneeze, blink, stare*).

Content and form

1. Sets of scrambled sentences are prepared on cards or a work sheet, and the student is required to unscramble them so that they make sense. To begin with, sentences are used that can be rearranged in only one way if they are to make sense (e.g., “Bread the the cut man” – “The man cut the bread”). Later on, scrambled sentences that can be unscrambled in two different ways are used (e.g., “The boy girl the saw” – “The boy saw the girl” or “The girl saw the boy”). In this case the student is asked to figure out the two ways that the sentence can be unscrambled.

To begin with, the student should be presented with relatively simple types of sentences (about three to seven words) that do not include negative words (e.g., *can't, not*). As the student progresses, negative concepts, question forms, and other more complex forms can be incorporated. Scrambled sentences can be prepared by abstracting sentences from readers. Scrambled-sentence activities can be modified by picture cues and the underlining of subjects, verbs, and objects using a colour code to help the student figure out how to arrange the words in the correct order.

2. The student listens to (or reads) a set of simple statements and is asked to change these sentences so that they have the opposite meaning. When integrated with reading, key words can be underlined to make the sentence and vocabulary changes more explicit.

Examples:

<u>He</u> is singing.	<u>She</u> is singing.
Jane <u>can't</u> ride a bike.	Jane <u>can</u> ride a bike.
They <u>came</u> indoors.	They <u>went</u> outdoors.

3. Work sheets or cards containing question-and-answer pairs are prepared. After reading or listening to a pair, the student is asked to identify which sentence is the question and

which is the answer. Key words can be underlined to make the vocabulary and word-order changes more explicit.

Examples:

What is <u>she</u> doing?	<u>She</u> is running. (Note word-order change.)
Who chased the dog?	The cat chased the dog.
What is <u>he</u> washing?	<u>He</u> is washing his car. (Note word-order change.)

4. The teacher prepares multiple-choice items containing *active* and *passive* sentences and ungrammatical combinations of words. The student is asked to choose a paraphrase for each sentence. The following sequence can be used as a guide for preparing task items.

Instruction Find a sentence that tells the same thing as the following sentence:

Stimulus Sentence The bird ate the worm.

Multiple Choice

- a) Bird the worm ate.
- b) The worm was eaten by the bird.
- c) The worm ate the bird.

5. a) Students are taught to recognize the smaller parts of speech (e.g., pronouns, prepositions, articles) by sight. These types of sight words should be taught in a meaningful context. Individual word cards and incomplete sentences should be prepared according to the following format.

Word cards he she they

Incomplete Sentences

Tom's bike is broken. _____ asked his dad to fix it.

Mary was hungry so _____ ate a cookie.

The teacher then places an incorrect word in the missing slot and reads the "silly" sentence to the student (e.g., Tom's bike is broken. She asked his dad to fix it.). The student is asked to indicate whether the word does or does not belong. The student then replaces the incorrect word card with the correct word card and reads the corrected sentence aloud.

b) As the student gains success with this, the teacher can simply read an incomplete sentence and have the student choose the word that fits into the missing slot. Note that the student should be familiarized with the word cards at the beginning of each lesson.

6. The student silently reads a sentence. The teacher then reads the sentence aloud but incorrectly reads the target word, thus creating an absurd or silly sentence. The student can then be asked to correct the teacher's error.

Example

Stimulus sentence (read silently by both the student and the teacher): The man got into his car and then he went to work.

Absurd sentence (read aloud by teacher): The man got into his car and they went to work.

In the preceding two types of activities, only a few target words should be introduced at any one time. When the student shows fairly consistent success with these, a new target word can be introduced.

Strengthening ability to retain literal information

1. Before reading a short passage to the student, the teacher tells him or her what piece of information is to be listened for (e.g., "Listen to this story so you can find out how fast the train was going."). This is repeated for a variety of pieces of information contained in the same paragraph.
2. A set of questions about a hypothetical short story is prepared and the questions are examined with the student. The student is asked to decide what information would be in the story so that someone could answer the questions. When the student has determined the information that must be in the story, he or she is asked to write the story with the teacher's help.
3. Given a short story, the student makes up factual questions based on the story content for someone else in the class to answer. The student then assesses the second student's answers. This activity may be carried out with pairs of students making up questions and exchanging them with other pairs as well.

4. Sentences are prepared that contain a fact that could not be true (e.g., 'The car turned the corner at 600 km an hour.'). The student identifies the incongruous word(s) and replaces it with an appropriate one. This type of activity helps students learn to pay attention to details.

Relating information among sentences

1. The student chooses ideas that tend to go together (e.g., wind blowing: a) kite flying, b) losing hat, c) windmill moving). The student can then be asked to combine these ideas into a sentence.
2. The teacher reads a short three- or four-sentence paragraph that contains one sentence that does not belong (or make sense) in the paragraph. The student then identifies the sentence that does not make sense. This is followed by a discussion on why the sentence does not belong.

Example

Car racing is a dangerous sport. Cookies are good to eat. The cars go around the track at very high speeds.

3. Students play sentence guessing games to develop inferential skills. The teacher prepares cards with simple sentences, such as the following, on one side (Side 1):

- The boy rode to school.
- The lady swept the floor.
- The man dried his face.

On the reverse side (Side 2) of the cards, the teacher writes corresponding phrases that tell what instrument, location, and so on, could be used to make the inferred information explicit. For example:

- on his bicycle
- with a broom
- with a towel

Heightening awareness and use of semantic and syntactic context clues

All of the following closure activities should be done using individual sentences. These same activities can then be completed using short paragraphs at first and longer passages later on.

1. A set of incomplete sentences is prepared in which the last word of each sentence is missing (e.g., The man swam in the _____). The student listens to or reads the incomplete sentence and is asked to fill in the missing word. While many responses are possible, the goal is to complete the sentence so that it makes sense. This activity may also be integrated with oral-reading activities. For example, the teacher can cover a word in each of several sentences within a passage that the child is reading aloud.

2. Closure activities can progress to a multiple-choice format in which all choices are semantically appropriate, but one choice provides the most *precise semantic fit*.

Examples

Bob felt so excited that he _____ to the door.

Susan was so happy that she _____ through the park.

(Choices: *raced, walked, shuffled, rushed.*)

3. If the students are successful with the above types of closure activities, they can attempt closure activities that encourage them to attend to or use phonetic-letter, syntactic, and semantic information when they are filling in the missing blank.

Examples

The boat is on the l _____.

The circus has a funny cl _____.

Activities for strengthening sound segmentation and auditory analytic skills

For activities within this area of language development (sound analysis and sound blending), procedures adapted from the work of Elkonin should be consulted. A good source for these procedures is Geraldine P. Wallach and A. D. Lee, "So You Want to Know What to Do With Language Disabled Children Above the Age of Six?", *Topics in Language Disorders* 1:1 (December 1980), pp. 99-113.

Reading

Although it is expected that students receive instruction in reading during the Primary grades, reading is a skill that continues to develop throughout life, taking on different aspects and emphases at different stages. In the Primary grades, reading instruction is directed to developing and acquiring skills in the learning-to-read process. The emphasis in the Junior grades is on vocabulary development and comprehension skills, for at this stage a student is reading for understanding to interpret what is presented on the printed page. Advanced skills are directed to: reading in the content subjects, critical and evaluative reading, the development of study skills, and the acquisition of speed and flexibility in reading. To develop reading ability maximally requires daily practice, as does any skill that depends on learning a code, such as playing the piano and typing.

Learning to read, like all learning experiences, is affected by such factors as intelligence, maturation, physical health, visual and auditory acuity, emotional stability, experiential background, educational opportunity and school attendance, readiness, and motivation to learn. In the case of specific reading difficulties there may be the additional factor of heredity where there is a tendency among family members, particularly male, to have extreme difficulty in learning to read, despite average or above-average intelligence and achievement in other areas. Reading difficulties are manifested in the following ways:

- slow rate of reading;
- reading word by word;
- confusion related to words such as *the, they, them, there, who, when, where*;
- poor ability to discriminate visual likenesses and differences in the absence of any visual-acuity defect (*man-name, almost-among, always-away, boy-dog, who-how*);
- extreme difficulty remembering the printed form and its spoken counterpart, whether words, letter symbols, or word parts;
- poor ability to make the visual-spoken association of words in different contexts and in different sizes and types of print and even from one page to the next;
- difficulty in discriminating, sequencing, or blending sounds or word parts;

- directional confusion (*b-d, p-q, m-w, u-n; was-saw, no-on*) long after these confusions should be sorted out;
- gross mispronunciation of words;
- omission or insertion of words and letters;
- many repetitions of words or groups of words when reading orally;
- inability to remember what is read;
- inability to understand what has been read.

Teachers must understand the reading process in order to provide for the reading needs of learning-disabled students. The following points summarize the key elements of the process:

- Reading is a receptive-language process.
- Reading is a thinking process.
- Meaning is the goal of reading. Reading involves both bringing meaning to print and taking meaning from print.
- Reading is a psycholinguistic guessing game. It involves predicting (sampling and selecting information), guessing (confirming or rejecting guesses), correcting, and reprocessing.
- The following three systems operate simultaneously in the reading process:
 - a) grapho-phonetic – print experiences and knowledge of the print system;
 - b) syntactic – experience and knowledge of language structure;
 - c) semantic – experience and knowledge of the world and its language terms.
- Reading is a personal, unique experience.
- Miscues are to be expected in the reading process.
- Risk taking is an important element in the reading process.

Many students with learning disabilities require special reading programs. The reader who reads significantly below his or her expected level requires an instructional approach other than the one found to be inappropriate in the regular class. Multisensory approaches, combining

visual, auditory, tactile, and kinesthetic feedback, are often the most helpful. In matching reading approach with the needs of each student, the teacher must be knowledgeable about a wide variety of reading strategies. Prior to the implementation of any approach, however, an assessment of the student's reading skills and an analysis of the task to be presented is essential. The teacher must then establish specific long- and short-term objectives to give purpose and direction to the program. Because most students involved in a special program are already lagging behind their peers, it is important that time is not wasted on things that the student already knows. Instructional time must be devoted to mastering those skills that the student has not yet acquired.

Teachers should be aware of the following principles of reading instruction for the learning-disabled student:

- A positive self-concept is promoted through successful reading experiences.
- It is essential to provide challenging reading materials at each student's instructional level that will allow the student to read with ease and fluency.
- Since reading is only one facet of language, instruction should provide for the integration of reading with the other facets of language (listening, speaking, writing).
- Since meaning is the goal of reading, instruction must be comprehension-centred.
- Language in context should form the basis of all reading instruction. Thus, *specific needs such as improvement in oral reading, retention of sight vocabulary, and the development of phonic skills should be developed through techniques involving contextual reading. Although specific skills should not be taught in isolation, they may subsequently be practised and tested in isolation.*
- Students should be exposed to a wide range of reading materials related to their linguistic competence. These materials must be highly predictable on the basis of the learners' language abilities.

- Students should be taught to identify unknown words through contextual clues. While prediction based on language context may result in miscues, the encouragement of self-correcting strategies ensures meaningful reading.
- Students at all levels should be read to daily in order to extend their oral-language concepts as a basis for writing.
- Opportunities must be provided for daily practice.
- Students need to interact with peers in group instruction so that they are able to see themselves as contributing members of the class. They should also have their individual needs met in a one-to-one or small-group situation.
- Workbooks and drill sheets should be used with discretion. These materials are not instructional in nature, but provide practice for a skill that has been recently taught.

Students with severe reading difficulties are often *instruction-dependent* learners. They need to be helped to become *independent* learners. Teachers can help them to achieve this by:

- understanding the reading process;
- knowing what to do before, during, and after reading;
- analysing their students' reading and identifying areas in which they need help (e.g., decoding, comprehension, using appropriate strategies);
- bringing to the surface what the students already know (knowledge they may not be readily aware they possess);
- making sure the students know what they think they know;
- ensuring that their students make use of the knowledge they have;
- knowing what to do to make things go right instead of intervening only when things go wrong;
- realizing that the little things they say when students get stuck are very important;
- asking students what they do when they get stuck and trying to find the best among a variety of strategies to help them;

- presenting material in context;
- reading the text aloud to demonstrate (model) intonation;
- ensuring, particularly for secondary students, that reading is related to other subject areas (e.g., history, science, English). Many resource teachers find that using subject-area texts in the reading program is essential if students with reading difficulties are to have any chance of keeping up with their peers.

Since teachers have a greater influence on reading achievement than any specific approach or any specific reading materials, it follows that reading must be *taught*. It is insufficient to consider teaching reading as the mere assignment of pages to be read and questions to be answered. Where this occurs, comprehension suffers because students do not understand the words; they are unable to pronounce them and do not grasp their meaning. Prior to beginning a reading lesson, difficult words should be taught with an emphasis on pronunciation and meaning, especially multiple meanings.

The intent of the following section is to provide the teacher with information of a practical value in determining a student's reading skills and, following this, in providing appropriate instruction.

Identification of reading level

Many school systems use standardized reading tests to determine student reading levels (and grade placements). The results of group-administered standardized reading tests must be viewed in relation to the groups on which the tests were normed. Poor performance may be expected where the test items are unrelated to items used in the classroom. Individually administered oral-reading tests (e.g., Gray Oral Reading Tests, Gilmore Oral Reading Test, Spache Diagnostic Reading Scales) rely on accuracy, rate, and comprehension to provide grade-level scores.

Perhaps the most useful vehicle to determine placement is the informal reading inventory (IRI), which employs classroom instructional materials and, as such, provides useful, relevant, and applicable diagnostic information for the teacher. The IRI may be limited to identifying a student's instructional level, or it may be extended to determine his or her independent reading level and to obtain information regarding vocabulary, phonic, and word-analysis skills.

In terms of any specific reading material, students may be said to be reading at the independent, instructional, or frustration level:

- The *independent level* is the level at which a student can read easily without assistance and with good comprehension. The student's accuracy rate (pronunciation of words) should be 99 per cent and his or her comprehension-of-meaning rate should be 95 per cent. Sometimes called the basal level, this is the level at which a student may profitably do study-type reading.
- The *instructional level* is the level at which the student experiences some difficulty, perhaps in vocabulary, word-recognition, word-analysis, or comprehension skills. The student's accuracy rate should be 95 per cent and comprehension rate at least 75 per cent. The reading program in the regular classroom should be geared to the student's instructional level.
- The *frustration level* is the level at which a student's reading skills break down. Errors are numerous and comprehension is sketchy. The student's accuracy rate is 90 per cent or less, and his or her comprehension rate is 50 per cent or less.

Teachers can use the following steps to construct an IRI:

1. Select a book or series of books in which the student is expected to work.
2. Select from each book two representative, unfamiliar reading samples.
3. Make a word count of each selection (30 to 50 words for the first or second grades, increasing in length up to 150 to 300 words for senior high school).
4. Prepare comprehension questions (who, what, where, why, vocabulary, and meaning) for each reading sample.
5. Select one reading sample for the student to read orally. Record the errors and observe the student's reading behaviour (e.g., word-by-word reading, repetitions, omissions, insertions, mispronunciations).
6. Check comprehension.
7. Give the student another reading sample to read silently. Explain any word the student does not know. Observe the student's reading behaviour (e.g., whispering, rereading) and take note of the time required.
8. Check the student's comprehension. Silent reading might be best checked by asking the student to recall what he or she can remember, since the student is not assisted by the wording of questions.

9. Move upwards with the reading samples until the error rate is 10 per cent or more (frustration level) and downwards to the 5 per cent error rate (instructional level) and 1 per cent error rate (independent level).

The IRI may be made more extensive by the addition of vocabulary or word-recognition tests and a phonics checklist similar to the models that follow:

Vocabulary Test

1. Prepare a list of at least 20 words for each reader, using the list of new vocabulary printed at the back of each reader. If 200 new words are introduced in that reader, select every tenth word to make a vocabulary test of 20 words.
2. Select words that are representative of the word-identification skills that are to be taught at that level.
3. Use 1 per cent, 5 per cent, and 10 per cent error rates to establish the independent, instructional, and frustration levels.
4. The vocabulary test may provide the approximate starting level for oral reading.

Sight Word Test

1. Give the student a copy of the Dolch Basic Sight Word Test (220 words).
2. Ask the student to read all the words he or she knows.
3. If the student knows one-third of the words, he or she is reading at the end of the first-reader level. Two-thirds indicates the end of the second reader; and all the words the third-reader level.

Phonics Checklist

1. Arrange the letters of the alphabet in random order on a dittoed sheet.
2. Ask the student to give each letter's name and its sound.
3. Include phonic combinations such as *sh*, *th*, *wh*, *ch*, *oa*, *ay*, *oi*, *ay*, *ai*, *aw*, *ee*, and *ea*.
4. Include nonsense words such as *sab*, *chay*, *feen*, *noik*, and *laip* to test the student's application of phonic skills.

Miscue analysis

The analysis of miscues in reading was developed by Kenneth S. Goodman in 1962 as a technique for studying closely what children do when they read. By comparing a student's expected oral-reading response with his or her observed oral reading, Goodman sought to gain insight into the reading process. From his initial work in this area, miscue analysis has developed into a diagnostic procedure. In his book *Miscue Analysis* (Urban, Ill.: National Council of Teachers of English, 1977), Goodman states that the procedures in all miscue analyses are relatively uniform:

1. **An appropriate selection is made for each student.** This is a story or other reading selection that is somewhat difficult for the student. The student reads the entire story, so it must not be longer than he or she can handle at a single sitting. However, it must be long enough to generate twenty-five or more miscues. More than one selection may need to be tried to find one that is appropriate. The selection should have the continuity of meaning that unified stories or articles provide.

2. **The material is prepared for taping.** The student reads directly from the book. The teacher or researcher needs a work sheet on which the story is retyped, preserving the lines of the story exactly as they are in the book. Each line on the work sheet is numbered according to the page and line of the story so that miscues may be identified as to where they occur.

Students are told that they will receive no help while they are reading. They are encouraged to do the best they can to handle any problems. They can use any strategies they know; they can guess or skip a word and go on.

As the student reads, the teacher follows, marking the miscues on the typescript. Too much happens for everything to be noted as it occurs, so the entire reading, including retelling, is tape-recorded. Later the tape is replayed to complete the marking of the miscues on the work sheet. The work sheet becomes a permanent record of the session, and the basis for the miscue analysis.

3. **The reader retells the story.** After reading, the reader is asked to retell the story without interruption. Following the unaided retelling, the reader is asked open-ended questions to probe areas omitted in the retelling. These questions do not use any specific information that the reader has not reported. The teacher does not steer the reader to conclusions. The

reader's mispronunciations are retained in the questioning. A comprehension rating is based on an analysis of the retelling.

4. The miscues are coded according to the analytic procedure used. See, for example, "Taxonomy" in Goodman's Reading Miscue Inventory.

5. The patterns of miscues are studied. Because miscue analysis gets at the process and goes beyond the superficial, it produces information that can become the basis for specific instruction. If the reader shows insufficient concern for meaning, the teacher can devote attention to this. If a specific difficulty occurs, such as confusion of *wh* and *th* function words (*with, that; when, then; where, there*), strategy lessons can be designed to help the reader cope with it.

In noting such a difficulty the teacher can carefully find its limits. For example, the reader may not interchange other words starting with *w* or *t* or mix words like *whistle* and *thistle*. Only function words are confused. In this way the teacher can design a lesson that will help the reader use meaning and grammatical structure to detect when a miscue of this type has been made. The instruction will help the reader correct the miscue, and in the process such miscues will begin to disappear as the reader makes better predictions.

As a result of his reading-misues research, Goodman claims that the emphasis in reading instruction should be placed on comprehension of meaning rather than on the individual word.

Dyslexia

Any discussion of reading, and especially reading difficulties, must also include some reference to dyslexia. This term, *dyslexia*, originates from the word *alexia*, meaning the loss of ability to read because of brain injury. It is currently applied to such a variety of mild to severe reading difficulties that it has become debased. If some definitions and interpretations of dyslexia were followed, everyone would qualify as a dyslectic, since everyone at some time mispronounces, omits, substitutes, or transposes syllables or words, reads *through as though, single as signal, felt as left*, and so on. If the term *dyslexia* is to have any meaning, it must be reserved for students with the most severe reading and spelling problems.

Classic dyslectics have severe reading difficulties, read word by word, are unable to recognize words or to synthesize sounds and syllables in the correct order, have extreme difficulty with words such as *the, there, they, went, want, who*, and

so on, and as a consequence have difficulty in comprehending what they read, although they have good comprehension of what is read to them. The truly dyslectic student has even greater difficulty with spelling and written language than with reading. A word spelled by the dyslectic person may have little resemblance to the original word. Sentences may be difficult to understand because they lack such essential elements as subject and verb and because of the order of the words. The following examples illustrate these two types of problems.

1. Student A: boy, age 13, Grade 6 (WISC Verbal IQ – 110)

A frist trans were pulled by hores then they maKe a engen it was not to good. On one day gengenand a horen had a race ha hours was wing wining

2. Student B: boy, age 16, Grade 10 (WISC Verbal IQ – 110)

it is Modern game inbeteew football and baseball erquires great endworca girls playing area so smaller and at the big Western if umoisties they 20,000 at a game

The causes of dyslexia appear to be neurological in origin. In a paper presented to the 1979 Quebec Conference of the Association for Children With Learning Disabilities in Montreal, MacDonald Critchley suggests that developmental dyslexia, which he differentiates from dyslexia resulting from brain injury, is not the result of intellectual inadequacy, socio-economic factors, or any brain defect that can be determined by diagnostic procedures, but that, in most cases, there is a family history of reading problems. Critchley identifies the following characteristics of dyslectics:

- overall slowness in reading, punctuated by hesitations when unfamiliar or polysyllabic words are encountered;
- confusion of left-right sequence (*was-saw*);
- omission of short words: articles, prepositions, utility words;
- pluralization of a singular noun or the omission of a suffix;
- abbreviation of a longer word (*adosent* for *adolescent*);
- mispronunciation: omitting syllables or sequencing syllables in the wrong order;
- guesswork: the word read aloud usually shows the same beginning letter (*officer* for *official*, *finger* for *fringe*);

- substitution of a synonym (*curtains* for *drapes*, *beer* for *ale*);
- failure to recognize errors;
- unorthodox manner of reading: poor and irregular ocular movements; difficulty coping with length of line, size of print, and moving to the next line;
- written work marred by poor spelling;
- more than average time required to read, write, or do written assignments.

According to Critchley the “prognosis” for these students is good if five conditions are satisfied:

- they have high intellectual ability;
- they receive the earliest possible diagnosis;
- a sympathetic, enlightened, and encouraging attitude exists on the part of the parent and teacher;
- they receive intensive, individual instruction by a teacher who is trained and experienced in the techniques of teaching dyslectics;
- they have determination to succeed (“ego strength” or “guts”).

Critchley emphasizes that the remedy is educational and that, with good teaching, dyslectic persons learn to cope satisfactorily in society. Because many of them are superior in other areas of functioning, they will show their aptitude, skill, and creativity in other ways.

Specific strategies for teaching learning-disabled students to read

In addition to the ideas related to reading instruction that were presented in the General Language Activities section, the following strategies may be used to develop skills in various reading areas.

1. Oral language development. Since listening, speaking, reading and writing are interrelated, students should be provided with many opportunities to develop their oral language. These may include retelling stories, relating experiences, interpreting pictures, and group discussions. For details of oral-language-development activities, see “Language” (pages 13–21).

2. Beginning reading.

a) Language experience approach. This approach, as conceptualized by Russell Stauffer, focuses on the use of individual and group-dictated stories, the use of word banks, and the use of creative writing activities.

As a beginning reading approach it can serve either to supplement, or to substitute for, traditional basal reading programs.

b) Assisted reading. This is a technique to make reading easy for students. The student follows along while listening to poems, stories, or songs. The student then reads along with the teacher, practice rereading is provided, and eventually the student reads the material independently. Assisted reading may be used with individuals, small groups, or the entire class.

Reading material should be selected from basal readers and books in which predictable language is used.

3. Development of language and thinking.

a) Directed Reading-Thinking Activities (DRTA). This is a group problem-solving approach to teaching reading, which was developed by Stauffer in his book *Teaching Reading as a Thinking Process* (New York: Harper and Row, 1976).

Key concepts in the approach are:

- Reading and thinking can and should be totally interrelated.
- The development in students of both divergent and convergent thinking ability is a primary educational objective.
- Critical reading for meaning must be developed at all stages of learning to read.
- Students make maximum reading progress only if they are taught at their appropriate instructional level.
- Group interaction, in which students are encouraged to hypothesize and examine and verify ideas stimulated by their reading material, must occur.
- Members of the reading group must be at approximately the same instructional level in reading.
- The reading material selected must be unfamiliar to the students.
- The teacher is responsible for providing an accepting, non-threatening environment in which the students are free to interact with one another.
- New words should not be presented before the DRTA process begins. They are met in the context of the story.

Students ready to begin working in DRTA are those who are able to read a first reader or equivalent material.

Basic steps in the DRTA process are:

Predicting – setting personal purposes for reading or accepting another child's or the group's purposes for reading. (The teacher's key questions include: What do you think? Why do you think so? What do you think will happen next?) After a general discussion, each student should identify one thing to find out by reading. Several students may choose the same purpose.

Reading – testing (silent reading) and reasoning (thinking) to find out whether predictions are accurate or inaccurate.

Proving – discussing in the group context whether one's predictions were accurate or inaccurate or whose predictions came closest to the events in the story, and proving or disproving predictions by reading orally the appropriate sentence or section of the story. Oral reading must be preceded by the opportunity to read a passage silently.

b) *Reading-Thinking Content Instruction*. This group approach, developed by Dorsey Hammond of Oakland University (no text available at time of publication), is designed to improve comprehension of non-fictional material.

Key concepts in the approach are:

- The reader brings information to print as well as getting information from print.
- Different readers will gain different understandings of what they read. The more extensive their prior knowledge of the material the more effective their reading.

Basic steps in the process are:

- For a given topic, students are encouraged to give information on what they know, what they think they know, and what they want to find out. The teacher organizes this student information on the blackboard (charts, overheads) according to these three categories.
- The students read the information provided on the topic.
- Following the reading the students and the teacher verify what they found out by students responding to the following questions:
 - What was it you wanted to find out?
 - Did you find the answer?

- What was the most surprising or interesting aspect of the material you read?
- What have you learned?

c) *ReQuest*. This procedure, described by A. V. Manzo in "The ReQuest Procedure", *Journal of Reading* 13:2 (November 1969), pp. 123–26, is designed to encourage students to develop questioning behaviour and to improve their independent reading-comprehension skills. It may be used on an individual or group basis.

The key concept in the approach is:

- While teacher questioning and purpose-setting are important to reading comprehension, the development of the students' abilities to ask their own questions and to set their own purposes for reading is of greater importance.

Basic steps in the process are:

- The student and the teacher silently read a selection.
- They take turns asking and answering questions about the selection, the teacher providing a model for good questioning behaviour.

d) *Cloze*. As a teaching strategy, the Cloze technique is used to improve the comprehension skills of students.

Key concepts in the approach are:

- Effective readers utilize the context of a passage to gain access to meaning.
- The reading material should be at the student's independent reading level.
- The length of the reading material may vary from single sentences to a passage of 150 words.
- Teachers may choose to delete every *n*th word or delete nouns, verbs, adjectives, etc., according to the individual needs of the student.
- Synonyms, or other appropriate replacements, are acceptable as long as meaning is not altered.

Basic steps in the process are:

- The teacher presents the procedure orally by leaving out words in a familiar passage and asking students to complete them.
- Unfamiliar passages are presented orally to the students for completion.

- Written passages are given to the students to complete.
- Student-teacher discussion of the exercise takes place to help comprehension.

e) *Imaging*. As a teaching strategy, imaging includes procedures that help students to visualize or create images of what they have seen, heard, read, or experienced.

The key concept in the approach is:

- Visualization helps learners to retain information, to see relationships, to draw conclusions, and to predict more effectively.

Basic steps in the process are:

- The teacher reads a passage to the students.
- The students tell the teacher what they saw in their minds.
- The students depict what they saw by sketching, painting, writing, or movement. The same method may be used with the student's own experiences, activities, objects, and pictures, as well as with what they have read, or what has been read to them.

f) *Semantic webbing*. This is a technique to develop comprehension by organizing information visually. It is described in "Enriching Basal Reader Lessons With Semantic Webbing", by Glenn Freedman and Elizabeth Reynolds, *The Reading Teacher* 33:6 (March 1980), pp. 677-84.

The key concept in the approach is:

- Visual displays of categories and their relationships are an effective way for teachers to organize and integrate materials and concepts for teaching.

Basic steps in the process are:

- The teacher determines the part of the story to be read prior to the development of the semantic web.
- The teacher determines which reading-thinking strategy is to be developed (e.g., predicting events, making generalizations, drawing conclusions).
- The teacher formulates the core question and writes it on the blackboard. All information and ideas generated for the web by the students are related in some way to the core question.

- The students respond to the core question, attempting to clarify and support their answers by drawing on what they have read. The teacher writes these responses on the blackboard.
- The students try to see relationships between the various answers.
- The teacher links responses schematically on the blackboard.

g) *Guided reading procedure*. This procedure, described by A. V. Manzo in "Guided Reading Procedure", *Journal of Reading* 18:4 (January 1975), pp. 287-91, is designed to help students remember the facts in a story or a textbook.

The key concept in the approach is:

- In order to become efficient learners, students need to develop unaided recall of specific information read, the ability to generate their own (implicit) questions as they read, an understanding of the importance of self-correction, and the ability to organize information.

Basic steps in the process are:

- The students are told that after reading silently they will be asked to recall as much of the information as possible.
- The students read silently.
- The students recall as many details as possible without referring to the text.
- The students return to the text to add additional information and to correct inaccurately recalled details.
- The students organize the material in outline form.
- The teacher asks thought-provoking questions designed to relate the material to what has been previously learned.
- The teacher tests students on their recall of details.

h) *Read, Encode, Annotate, and Ponder (REAP)*. This strategy for improving reading, writing and study skills is described by Marilyn Eanet and Anthony Manzo in "REAP - A Strategy for Improving Reading / Writing / Study Skills", *Journal of Reading* 19:8 (May 1976), pp. 647-52.

The key concept in the approach is:

- Using writing as a vehicle to translate an author's ideas into the reader's own

words encourages students' maturity and independence in reading.

Basic steps in the process are:

- The students are taught how to write annotations.
- The students:
 - Read to discover the author's ideas.
 - Encode the author's ideas into their own language.
 - Annotate these ideas in writing for themselves or for sharing with others.
 - Ponder the significance of the annotation.

4. Vocabulary development and retention.

- a) *Oral fluency.* The teacher and the student(s) decide on a category (e.g., objects in the classroom, furniture, clothing, fruits) and the student names as many items within that category as possible in one minute. The number of words given is recorded on a graph to chart growth.
- b) *Charting.* This strategy requires students to organize ideas and concepts from their reading into categories. Initially the teacher provides the categories for students, who then add appropriate information under each. As the students become proficient in categorizing the information in this way, they are increasingly able to develop charts on their own and utilize them as a study strategy. This strategy promotes clarity of writing.
- c) *Mapping.* See p. 99.

5. Oral-reading fluency.

There are two types of oral reading. Oral reading at sight is for diagnostic purposes only, whereas oral rereading is used for specific purposes, such as improving oral-reading fluency.

- a) *Repeated reading.* This technique is used to improve fluency of reading in terms of rate of reading and accuracy of word recognition. As rate of reading increases, comprehension improves, since less attention is required for decoding. In this technique the student rereads the same passage a number of times until a satisfactory level of fluency is achieved. Details of this approach are given in "The Method of Repeated Readings", by S. Jay Samuels, *The Reading Teacher* 32:4 (January 1979), pp. 403-08.

- b) *Neurological Impress Method (NIM).* This is a one-to-one method used to promote read-

ing fluency. The student and the teacher read aloud simultaneously, with the teacher reading at a slightly faster rate than the student to pull the student along. The student moves his or her finger under the words as they are spoken. Paul M. Hollingsworth describes how NIM may be used in the classroom in "An Experimental Approach to the Impress Method of Teaching Reading", *The Reading Teacher* 31:6 (March 1978), pp. 624-26.

- c) *Radio reading.* This technique provides the teacher with a viable alternative to the common practice of "round-robin" reading. Too often, oral-reading situations deteriorate into word-attack sessions. Unlike "round-robin" reading, radio reading does not allow for prompting or correcting. Rather, it focuses instruction on the ultimate goal of oral reading – to comprehend and communicate a message.

Radio reading derives its name from the analogy between a radio announcer talking to a listening audience and the oral-reading situation. The reader functions as the radio announcer with a script, and the listeners serve as the audience listening to a radio program. It is the purpose of the reader to communicate accurately a message in oral reading. The listeners respond by discussing and restating the message and evaluating whether the passage was clearly rendered.

6. Retention of sight vocabulary.

- a) *Visual-Auditory-Kinaesthetic-Tactile (VAKT) method.* Designed by G. Fernald and suggested for use with students with severe reading disabilities, the VAKT method is multisensory in nature. The Fernald VAKT technique focuses on individual words taken from the student's reading context and practised in isolation. The student traces the word with a finger, saying each part of the word aloud as it is traced, until it can be written without looking at the copy.
- b) *Word-learning techniques.* A student experiencing severe difficulty in learning words may benefit from one or more of the following techniques, which have proven helpful in assisting learning-disabled students in this area:
 - Print the word on a large card.
 - Trace it with your finger.
 - Make the word with plasticine.
 - Print it with a felt pen.

- Make it with alphabet letters.
- Print it on the blackboard.
- Trace it in jelly powder or sand.
- Use magnetic letters.
- Print it with crayon or coloured pencils.
- Make it with string.
- Print the word on a word card.
- Use the word in a sentence.
- Make or find a picture of the word (if possible).
- Find the word in other places.

c) *Development and review of a word bank.*

A word bank is a personalized record of words a student has learned to read or recognize at sight. It is developed from the dictated stories generated by the student and includes only words that the student has identified as being known across successive days. These words are printed on cards (one per card) and reviewed in a variety of ways, e.g., using the flash-card technique, locating the word in context, categorizing the words.

d) *Word tracking.* This strategy is used with words with which the student has difficulty. After the student has read, the teacher requests the student to do one or more of the following:

- Locate the word on a particular page.
- Determine the number of times the word occurs on the page.
- Given a synonym by the teacher, find the word on the page.
- Given a rhyming word by the teacher, find the word on the page.

e) *Wide reading.* By providing a wide range of reading materials (e.g., newspapers, trade books, magazines) on a daily basis at the student's independent reading level, wide reading develops and consolidates vocabulary.

7. Word-recognition skills.

a) *Phonics.* Phonics clues can help poor readers to unlock the printed sound / symbol relationship to recognize words. Areas of difficulty identified when the student reads in context provide the basis for the development of phonics activities. Phonics skills, although not to be taught in isolation, may be practised in isolation.

Sample procedure:

- The student has continuing difficulty with (for example) a certain vowel sound.
- The teacher refers back to the context in which the difficulty occurs and, through use of context clues and initial consonants, leads the student to the identification of the word.
- The teacher helps the student to identify the sound-symbol relationship of the difficult vowel.
- The teacher helps the student develop word families or rhyming words using this sound.

Word-recognition skills are also developed through word-bank, writing, and spelling activities.

b) *Structural analysis.* Structural analysis is the recognition of a known structural element such as a root word, prefix, or suffix in an unfamiliar word to unlock pronunciation and meaning. The student must have a personal and meaningful sight vocabulary before he or she is exposed to elements and principles of structural analysis.

8. **Reversals.** Of great concern to teachers and parents is some students' tendency to mirror-image or reverse letters and words (e.g., *b-d*, *was-saw*), to invert letters (e.g., *u-n*, *m-w*), or even to rotate letters so that they lie on their sides. Such signs are often viewed as an indication of perceptual distortion, dyslexia, or neurological impairment. However, research suggests that the tendency to confuse the orientation of letters, or to reverse words, is a normal characteristic in nearly all children up to about seven years of age. Reversals are so common among children in Kindergarten and Grade 1 that they are considered to be part of the normal difficulty experienced in learning to read.

The problem appears to be one not of sorting out the visual image, but of attaching the correct letter name to the appropriate orientation of the letter form. This is the type of problem that an adult might have in identifying identical twins by name. Students who show extreme difficulties with letter names and orientation are probably not maturationally ready to make these associations. In most cases, the reversals disappear by the end of Grade 2 or early Grade 3.

Although reversal tendencies persist in severe reading-difficulty cases, they are not

confined to them alone, for even good readers frequently reverse words or phrases. Because this is such a persistent problem in the early grades, teachers should consider the following suggestions:

- Tracing and printing or writing is necessary when teaching the letter form. Students should trace the letter, say it as it is traced, and then write it from memory. For students who appear confused by visual appearance, covering their eyes and having them write the letter without seeing it is often a successful procedure.
- Letters should be made in one continuous movement pattern. The ball-and-stick method of teaching printing is much too confusing for these students, for they do not know where to attach the stick.
- Students should be provided with cues to help them remember. For example, the sentence "The bat hits the ball" will help them remember the letter *b*. They will remember the letter *d* if they say the alphabet (a-b-c-d) and remember that *c* comes before *d* and that *c* forms the beginning of the letter *d*.
- Cue cards (with picture and letter) may be taped to a student's desk for easy reference.
- Students who have difficulty with letter orientation should never be seated so that they have to shift orientation when copying from the chalkboard or when using the classroom alphabet chart. These students should be seated so that they face the classroom alphabet directly, as well as the chalkboard, when they are working at their desks.
- Cursive writing should be taught as soon as possible because the cursive forms (e.g., *b-d* and *p-q*) are significantly different from each other.
- The left-to-right direction should be emphasized by drawing a green line down the side of the student's book as well as down the side of the chalkboard to indicate the starting place.
- On flash cards as well as in chalkboard work the first letter of each word can be printed in green to indicate the beginning.

- Students can be allowed to use a finger, pencil, or stylus as a guide in reading. By tracing the first letter of reversible or confusing words with a stylus, students will get started with the appropriate sound.
- Students can push a marker (a file card with a slot cut in it large enough to expose a line of print a little at a time) along the line from left to right.
- An arrow, pointing towards the right, can be drawn under words or sentences.
- Students can be allowed to use a typewriter, which in its operation reinforces the left-to-right sequence of letters in words.
- Perhaps the best measure is to correct the error when it first occurs. Continued practice in printing a letter, word, or name the wrong way eventually becomes so entrenched that it becomes more difficult to correct.

In some instances younger students with severe reading difficulties may benefit from some of the following activities:

- colouring
- painting
- outlining
- tracing
- using activity books with dot-to-dot designs
- making pegboard designs, stringing in sequence coloured beads or shells of different shapes
- sorting objects according to size, colour, function, or form
- constructing pictures or objects (cut and paste)
- noticing likenesses and differences (Many children's activity books have excellent pictures that are ideally arranged to develop these skills.)
- completing jig-saw puzzles

- using pictures to identify what is missing, what does not belong, or what is wrong in the picture
- using playing cards to separate the diamonds from the clubs, the spades from the clubs, or the spade face cards from the club face cards
- playing card games such as Animal Rummy, Authors, and Snap (The ability to match similar pictures or shapes is basic to the ability to match letters and words.)
- examining pictures to interpret what is happening, to note details, and to predict what is going to happen (This forms a basis for reading comprehension.)
- examining pictures for a limit of five or ten seconds to try to recall as many things as possible
- listening to identify sounds (e.g., a clock ticking, a bell ringing, a bird singing, a horn tooting)
- listening to identify sounds as being far or near, loud or soft, high or low
- listening to identify sounds that appear the same or different (e.g., the same notes on the piano, different notes on the piano, the same tune sung twice, different tunes)
- listening to identify words that are the same or different
- listening to identify words that start the same or end the same
- listening for the sound at the beginning or end of a word
- representing a rhythm by hand claps
- listening to follow a series of instructions
- listening to remember a phrase in "Pass it on"
- listening to remember a list of items in the game Grandmother's Trunk or "I went to camp and I took . . ."
- listening to tell a story or to finish a story
- listening to memorize telephone numbers, addresses, postal codes, emergency numbers
- listening to memorize songs and verses (rhymes)

9. Textbook skills. At the higher grade levels one of the greatest assets a teacher can provide to students is textbook skills; a knowledge of how to use textbooks effectively and efficiently. In the Junior, Intermediate, and Senior grades, the textbook plays an increasingly significant role in school learning. For this reason it is imperative that students with reading difficulties receive specific instruction in textbook use. The following are the main features of a textbook to be considered:

- *Contents page.* The table of contents should be presented and discussed, as it provides an overview of the contents of the book. Following a discussion of the list of contents, the students should have acquired a knowledge of what specific topics, skills, and activities are covered and the order in which they are presented.
- *Signalling devices.* Signalling devices include chapter subtitles, headings, bold-face type, topic sentences, italics, illustrations, charts, maps, pictures, and so on. If they understand that these devices are used by the author to call attention to the most important information, students, especially those with reading difficulties, will read more efficiently and with greater understanding. They should be taught that by rephrasing a heading in the form of a question, the answers to that question are to be found in the reading material that follows. Similarly, the topic sentence, which may be in bold-face type, indicates the subject matter included in the paragraph that follows. Students should be made aware that illustrations, charts, maps, pictures, and so on are included in textbooks to clarify the information presented.
- *Textbook questions or summaries.* Many textbooks include a series of questions at the end of each chapter to provide a review of the content of the chapter. It is suggested that students with reading difficulties be given the questions first in order to establish a purpose for reading. Most textbooks have a summarizing paragraph at the end of each chapter, or a paragraph with the heading "Summary". Teachers can provide further help by indicating the location and function of the summary.

- *Index.* Students should be taught the function of the index and the difference between the table of contents and the index. Practice in using the index, similar to the practice given in the use of the dictionary, will enable a student to use the index for locating specific information quickly.

Generally, comprehension difficulties can be minimized if reading lessons are well organized and prepared creatively. Frequently, however, the reading level of a textbook is significantly above the grade level for which it was intended. In such cases, the teacher should attempt to use a parallel text that will provide equivalent information at a lower reading level. If this is not possible, there are three other options. First, the teacher may present as much information as possible in an oral lesson, supported by related visual material (pictures, objects, slides, films, filmstrips, or videotapes). Second, a more senior student, a better reader, or a parent volunteer might read the book to the student and discuss it as it is being read. Finally, the book might be rewritten to simplify its reading vocabulary and structure.

10. **Motivating materials.** Students who have for several years experienced reading difficulties eventually become "turned off" by reading. It is difficult to appeal to this type of student through traditional reading materials. By the age of eleven or twelve, girls and boys have developed keen interests in the world around them. It is up to the teacher to employ these interests as a basis for making reading acceptable and enjoyable. The following list of materials may provide the key to motivating even the most reluctant reader:

- baseball, football, or hockey cards
- rule books for hockey or football
- athletic programs
- *Sports Illustrated* magazine
- sports pages from the daily newspapers
- souvenir pamphlets or programs
- biographies of heroes or heroines in sport, theatre, movies, and so on
- greeting cards
- joke books
- comic strips
- riddles

- bumper stickers
- tongue twisters
- popular songs
- record jackets that offer biographical information about the artist
- travel brochures
- airplane, bus, and train schedules
- maps
- classified advertisements (want ads, lost and found, articles for sale, employment wanted)
- commercial advertisements (cars, boats, clothing, holidays, entertainment)
- advertising circulars or brochures for cars, motorcycles, bicycles, boats, snowmobiles, and so on
- repair manuals and parts catalogues for motorcycles, bicycles, and snowmobiles
- catalogues (Sears, Canadian Tire, Consumer's Distributing, etc.)
- telephone book (Yellow Pages)
- TV guides
- horoscopes
- columns such as "Ann Landers" and "Dear Abby" (appropriate selected letters)
- cereal and food boxes
- cookbooks, fashion books
- patterns (how to read and interpret a dress pattern)
- recipes (how to read and interpret a recipe)
- how-to manuals (knitting, sewing, macramé, skiing, fishing, baby-sitting, running a marathon, etc.)
- books for runners and joggers
- *Guinness Book of Records*
- bonus coupons, lottery tickets, and so on
- science magazines
- nature books (birds, animals, fish, flowers, etc.)
- driver's manuals
- first-aid booklets
- consumer information (how to be a good consumer - a kit may be obtained through the Ontario Ministry of Consumer and Commercial Relations)

- banking information (how to start a bank account, how to make a deposit or a withdrawal, interest, etc.; material is available from local banks)
- newspapers (For ideas see *Learning From Newspapers* (1974) and *Learning From Newspapers: Reading* (1975) by Hugh Partlow, both available through local newspapers or the Canadian Daily Newspaper Publishers Association, 321 Bloor Street East, Toronto, Ontario M4W 1G9.)
- television (For suggested activities see A. H. Adams and C. B. Harrison, "Using Television to Teach Specific Reading Skills", *The Reading Teacher* 29:1 (October 1975), pp. 45-51.)

Writing

Writing involves two important components: a product and a process. Since the product of writing is communication, it must be clear, forceful, and grammatically acceptable to the intended audience, contain few exotic spellings, and be presented in legible form. But writing is also a process that helps to refine thought, heighten awareness, deepen sensitivity, and develop new insights. An overemphasis on the product tends to reduce both the value of writing as a process that helps the writer to grow and, paradoxically, the probability of attaining the best possible product. When children begin to think of writing only as a product, they cease to enjoy the process and tend to produce results that are below their capabilities.

Writing as process and product should therefore not be separated, and the writing program should be founded on the following five principles:

- Students learn to write by writing.
- Students should be encouraged to write a great deal, more than the teacher can mark or write comments on. This helps them to become better writers and eliminates the notion that writing is performed only for a mark.
- Personal writing, in which writers choose their topics because they have something to say, should form the basis of the writing program. Through these writing experiences, students learn the process.
- Teacher-directed writing should be related to a specific purpose, such as the development of organizational skills, the summarizing of

specific content, note making, project writing, or preparation for exams.

- Primary children should be introduced to the writing process through their own personal writing.

Before they begin to write formally, students should have many informal writing and reading experiences and should be able to read easy-to-read books. As well, their informal writing should indicate that their understanding of the sound-symbol relationship of consonants is developing. As students develop their writing abilities, teachers should ensure that:

- daily time is provided for writing;
- students are knowledgeable about their topics;
- students have the opportunity to "rehearse" their topics through talk, play, or art;
- they play an integral role in the writing process by modelling all of the writing stages and by sharing in the choice of topics, conferencing, rehearsal, revision, proofreading, and publishing of the students' work;
- the young writers have the opportunity to share their writing with a variety of audiences, possibly through some "published" form.

At the beginning, young writers will do little or no revision. The first draft will be enough. A form of early revision may involve students in reading their writing to the teacher, who records a correct final draft. As soon as possible, however, the teacher should encourage students to make any changes they wish to make during or after reading their writing to the teacher.

Another possibility is to have students tape-record what they want to write down (e.g., a social studies report or book review). They can then listen to their tape and decide whether they want to make any changes to it. The recording can then be transcribed on paper. The teacher should correct the spelling and syntax in the written copy. However, no attempt should be made to teach spelling or grammar skills at this point. Finally, students can recopy or type their final copies.

As students continue to write, they can use journals to help them develop writing fluency and charting to develop organizational skills. Some other ideas are presented in the last section of this handbook, "Special Needs of Secondary School Students". Still other useful teaching ideas may be found in such books as Donald Graves's *Writing: Teachers and Children at Work* (London: Heinemann, 1983).

The following summary divides the writing process into ten easy steps:

1. The student discusses (rehearses) a recent experience with the teacher and a small group of peers. Another stimulus for such a discussion could be a picture that the student has drawn or painted about the experience.
2. The student writes a draft of a story stemming from the discussion. The student should be allowed to use inventive spelling because the important thing at this point is to encourage fluency.
3. The student reads his or her story to the teacher or to the group and the teacher.
4. As the story is being read, or after it has been read, the teacher prints or types a final copy. At first, the teacher should stop at this point in the sequence of steps. *Steps 5 to 10 should be added gradually.*
5. The teacher makes copies of the printed or typed final draft and distributes them to the group. The student reads his or her story to the group. In order to promote the development of audience reaction, the teacher asks, "What did you like about the story?"
6. The teacher, the writer, and the group have a small conference in order to elicit more details to extend the writing. The teacher should ask such questions as, "Would you like to add anything to your story?" or, "Would you like to change anything in your story?" The group can make suggestions from what they remember from the original discussion.
7. Each student makes changes or additions to his or her writing if he or she wishes. The student may dictate the changes or additions to the teacher.
8. The teacher asks the student to indicate words with which he or she had trouble so that the teacher can demonstrate the correct spelling, if necessary. The teacher should encourage the use of inventive spelling in the rough draft by saying, "Write the word as best you can," when the student asks how a word should be spelled.
9. The final draft is signed, dated, and placed in the student's individual writing folder.
10. After the student has placed five stories in the folder, he or she is given the opportunity to select one for "publication". If the story has not already been illustrated by the student, he or she should do so, and the teacher should type the selection. A final page may be added with personal facts about the

author. The pages are then bound simply to make a little book, which is then shared with the class and placed in the classroom library.

Spelling

In order to spell a word one must first hear the word correctly. That is, the sounds or phonemes must be identified, discriminated, and placed in the correct order. Before the word can be represented orally or in writing, a match must be made between the sounds (phonemes) that are heard and the symbols (graphemes) that represent those sounds. To do this requires association and accurate recall of the sound-symbol correspondence. To spell orally one must hold the word in memory, while recalling and naming the symbols in sequence. Written spelling adds a further component.

In view of the high level of integration that is required to perform this complex task, it is not surprising that spelling is frequently an area of serious difficulty for some students. However, in addition to the inherent difficulties that a student may have with spelling, difficulties may also arise as a result of poor teaching practices. Some students may not have been taught the relationship between sound and symbol (e.g., *stamp-stab*) or the importance of letter order within a word (e.g., *said-siad*).

Spelling errors may be perceived as being the result of carelessness or as occurring because the student has not studied. As a result of numerous errors, the student may be required to write out each misspelled word several times. Unfortunately, the student will still not see the errors or understand why the word is wrong. He or she may write it correctly the first few times and then wrongly each successive time because the relationship between sound and symbol is not established or meaningful.

A good spelling program, like all good programs, is based on the identification of individual needs. In order to determine specific difficulties, the teacher must examine the student's work from a diagnostic point of view. The weekly spelling list or a spelling test provides many clues as to the difficulties a student is experiencing. Among the most popular diagnostic spelling tests is the Kottmeyer Diagnostic Spelling Test. It supplies words that test the various phonic elements, provides an analysis of errors, and sharpens a teacher's ability to identify various types of spelling difficulty.

When administering a diagnostic spelling test, or indeed any spelling test, the teacher must make sure that each word is enunciated clearly, that its meaning is determined by the sentence in which it is used, and that each student has sufficient time to make a response. Only when these

criteria are met can the possibility of poor teacher dictation be ruled out as a cause of errors.

In analysing errors, the teacher should consider the following questions, which will indicate the content, direction, and emphasis of a good spelling program.

- Does the student hear the word (e.g., *hand* for *land*)?
- Does the student discriminate the sounds (e.g., *send* for *sent*)?
- What sounds are difficult to discriminate (e.g., *not* for *nut*, *big* for *beg*)?
- Does the student hear the sounds in the right order (e.g., *flet* for *felt*)?
- Does the student hear all the sounds (e.g., *stap* for *stamp*)?
- Does the student hear all the syllables (e.g., *in-trest* for *in-ter-est*)?
- Does the student confuse letter symbols (e.g., *dog* for *bag*)?
- Does the student know how to write or print each letter? To join the letters?
- Is the student able to remember words that are not phonetic (e.g., *woz* for *was*, *sed* for *said*)?
- Does the student know and apply generalizations with respect to double vowels (e.g., *boat*, *train*)? Removing the *e* before adding *ing* (e.g., *take-taking*)? Doubling the final consonant immediately following a short vowel (e.g., *hop-hopping*)? Pluralizing words ending in *y*, *f*, *s*, *sh*, *ch*, and so on?

The problem of the regular versus the irregular pattern of English spelling has always existed. However, it is put in perspective when one considers that about 85 per cent of English words are phonetically spelled. Thus, phonics instruction will add to the effectiveness of spelling instruction. In this way, the letter-sound relationships are immediately applied in a written (spelling) situation and phonics spelling and reading instruction are combined in an integrated and meaningful manner. For example, first graders are especially amused by simple one-sentence dictation that applies a phonic element just learned (e.g., ‘‘A cat sat in a hat.’’ ‘‘A frog jogs on a log.’’ ‘‘I wish for a fish on my dish.’’). Since 62 per cent of English words can be formed by knowing only the short vowel sounds, consonants, and consonant blends, a wealth of written language is available to the student who has been taught to use the basic phonic elements.

The spelling of many other English words follows specific generalizations. Thus, students' spelling can be improved if these generalizations are taught in the classroom. The following are

just a few of such generalizations. They suggest some of the ways in which phonics instruction can be integrated with spelling instruction.

- No word in English ends in *v* or *j*.
- *Q* and *u* always go together.
- Short words ending in *l*, *s*, or *f* tend to double the letter (e.g., *tell*, *brass*, *puff*).
- The vowel *e* is used to make a preceding vowel long (e.g., *mad-made*).
- When two vowels come together, the first is usually long (e.g., *boat*, *train*).
- The letters *c* and *g* have a soft sound when used before the letters *e*, *i*, and *y* (e.g., *cent*, *city*, *cycle*, *gem*, *ginger*, *gym*).
- The letter *k* is used to represent the /c/ sound before *e*, *i*, and *y* (e.g., *keg*, *kill*, *sky*).
- The letters *gu* are used to represent the /g/ sound before *e*, *i*, and *y* (e.g., *guess*, *guide*, *guy*).
- When the letter *t* precedes *ch*, the preceding vowel sound is short when there is no other consonant heard before the *ch* (e.g., *matches*, *ditches*).
- The letter *d* is used before *ge* to keep the vowel short when no other consonant is heard (e.g., *badge*, *ridge*).
- The final *e* is dropped in verbs before the suffix *ing* is added.
- The final consonant is doubled after a short vowel before adding a suffix to a word.

Finally, about 11–15 per cent of English words are phonetically irregular and do not conform to the pattern generalizations mentioned above. This list includes words such as *the*, *said*, *was*, *could*, *who*, *any*, *enough*, *you*, and *they*. Since the list of irregular words contains many high-utility words, it is essential that they be taught to the stage of automaticity.

There are many possible methods of teaching spelling skills to learning-disabled children. As in other areas, a multisensory approach is often successful. The following is a tracing procedure that can be followed with beginning spellers:

- The teacher writes a spelling word, in either manuscript or cursive form, in letters about 5 cm high with a black felt pen on a plain piece of paper.
- The student traces the word, following the letters written with the felt pen with the index finger of the writing hand. This is repeated six to eight times. As the student traces each letter, he or she should say it aloud. When the student finishes each tracing, the whole word should be said.

- The teacher puts a second piece of plain white paper over the first piece. The student takes a pencil and writes over the word, following the lines of the letters. The student says the letter symbols and the whole word at the end. He or she should do this about ten times, moving the paper up to a clean spot for each tracing.
- The teacher removes the top paper and has the student copy the word on the same sheet on which it was originally written for as many times as the student can get the word under the original word, saying the letters and the whole word each time.
- The student then tries to write the word from memory, either on another piece of paper or on the chalkboard. If this is not successfully accomplished, the student should go back to the pencil-tracing step and start from there.
- This process can be repeated using two new words. At the next session, the student's spelling of these two words can be checked. If the student can spell them orally and write them, two more words may be tackled.
- The student should immediately use each word in a sentence that he or she either writes down or dictates to the teacher to write down. In the latter instance, the student should copy what the teacher has written in a notebook or on cards.
- Back-tracing methods can also be used for spelling. In this case, students should keep their eyes open and look at the word on a card as it is traced on their backs.

Handwriting

A mastery of the mechanics of handwriting is necessary so that a student can concentrate on the content of the material to be written. Many students are unable to complete assigned work, make notes, write examinations, and complete examinations in the allotted time because of handwriting difficulties. Invariably, they squeeze the pencil too hard and press so firmly on the paper that an impression is left on the pages underneath. They become tense and rigid and often purse their lips as an indication of their frustration. In spite of the effort expended, they progress slowly, rarely finish on time, and their work is messy. Dispensations in the form of oral reporting or oral examinations are usually given to students for whom written expression is an insurmountable task.

In the past, a great deal of emphasis was placed on handwriting instruction because it was viewed as a level of one's literacy. Recently, however, the form and quality of handwriting has

been given less emphasis. Since a specific amount of time for instruction is seldom indicated, the formal study of handwriting is often bypassed, and students are left to devise their own systems of writing and printing. Many students laboriously "draw" the letters they see written or printed on the chalkboard. It is obvious in such cases that formal instruction is lacking and that insufficient opportunity is given for the development of the required automatic motor response.

It is suggested that writing instruction include supervised practice, immediate feedback, and good handwriting models. The aim of handwriting instruction should be legible handwriting produced without undue strain.

For many years there has been a controversy as to whether manuscript writing (printing) or cursive writing should be taught. At the present time manuscript writing is taught in the first and sometimes second grade, while cursive writing is often not introduced until towards the end of the second or beginning of the third grade. The case for cursive writing is as follows:

- Cursive writing utilizes a rhythmic flow.
- Words are seen as wholes. All elements flow together so that the student experiences the feel of the word.
- Cursive writing emphasizes left-to-right progression.
- Reversals are avoided.
- Confusing letters (e.g., *b-d*, *p-q*) are differentiated because their written forms and movement patterns are different.
- Letter alignment is easier to maintain because the student keeps his or her hand on the page until the word is finished. Spacing is easier because words are seen as discrete units.
- There is a consistent starting place: all lowercase letters start at the baseline with an upsweep.
- Time is saved, since there is no need to transfer to another system later on.
- Handwriting is faster than printing.

As with other learning difficulties, teaching procedures in this area should be based on an assessment of the students' specific needs. The best assessment is based on an observation of individual students as they work. In watching the students, the teacher should note the following:

- how they begin the task;
- what they do as they work;
- whether they watch their hands;
- whether they are comfortable;

- whether they have the proper tools to work with;
- how they grasp their pencils (Is the pencil held so far down that the student's fingers are touching the lead and consequently smudging the paper? Is it held so high up that the student is unable to maintain proper control? Are the fingers properly placed?);
- how they position their paper;
- their posture at the desk (Are they sitting upright with feet flat on the floor or are they slouching over the desk with their heads propped up by one of their hands? Are the desks and chairs the appropriate size and height? Do the students hold their books in place with their non-writing hand?);
- their movements (Are they able to make straight lines a half space or full space high? Are they aware of the need for word spacing or do all letters run together as one long word? Do the students sequence the letters correctly? Are the letters in the correct orientation?);
- whether they become obviously tense while performing the task;
- the effort that they put forth in attempting to accomplish the task. Watching students as they struggle to make letters in the right orientation, size, and spacing helps the teacher understand why the printing or writing task is so tiring.

These and other incidental observations provide the teacher with information as to the source of any difficulty.

Handwriting (or printing) instruction must be arranged to minimize frustration and to ease the total learning and teaching process. Based on an observation of the student's performance, the teacher may proceed to individualized instruction. Here, the goal is to motivate the student. This requires the teacher's full participation; the task should not be left to the student alone. The following steps provide for multisensory involvement as a means of overcoming the student's learning disability and therefore form an effective lesson:

- The teacher presents a large, clear visual pattern of the letter on the chalkboard or acetate (if using an overhead projector).
- The teacher traces the letter, verbalizing as the movements are made. For example, "Swing up, straight down, up, and dot" would be an appropriate verbal direction for the letter *i*.
- Students trace the letter in the air several times. As the students "skywrite", the teacher observes them to see where they start and the direction of their movements.

- Students make the letter on the chalkboard, tracing, if need be, the teacher's model. Students having difficulty may need more tracing, to have their hands guided, or, indeed, to close their eyes so that they can concentrate on the motor pattern. They should be encouraged to verbalize their movements. When the movement pattern is learned, the students are ready to work on work sheets.
- Practice work sheets, which have lines with the letter model to be traced and a line underneath for the letter to be copied, are provided. When preparing the practice sheets, the teacher should be consistent about starting each letter at the baseline with a swing-up movement. Each student's sitting position as well as pencil grasp should be checked.
- The teacher supervises the practice, being alert to those who may need reteaching.
- The teacher associates the sound of the letter with its shape as the student writes the letter. In this way a bond is established between the symbol and its sound.
- The written letter is applied to a word that the student can identify.

In teaching handwriting, the sequence of letter introduction should be based on the kinds of movements involved in letter formation. Letters having the same basic movement pattern should be grouped together. It is recommended that they be taught in the following sequence, which is arranged from easiest to hardest:

- the swing-up letters: *i, u, w, t, r, s, p, y, j*;
- the swing-up-and-over letters: *n, m, v, x, z*;
- the swing-up-and-turn-back letters: *e, l, b, h, k, f*;
- the swing-over-and-turn-back letters: *c, a, o, d, g, q*.

The question of joining letters is of great importance, as it creates many problems for students who have difficulty learning to write. Students should be taught how letters are joined. Practice in the following letter combinations will help the students:

- letters joined to *b*: *bi, bu, be, bl, bb, bo, ba, br, bs, by*;
- letters joined to *o*: *oi, ou, ow, ol, ot, oo, oa, oc, od, og, op, or, os, om, on, ov, oy, oz*;
- letters joined to *w*: *wi, we, wh, wl, wo, wa, wr, ws*;
- letters joined to *v*: *vi, ve, vu, vo, va, vy*.

Some students seem to be able to retain only one letter at a time in their memory. As a result, they

must continually look up to and down from the chalkboard. They must also check and recheck each letter of each word in each sentence to be sure it is correct. Such students should be taught how to copy from the chalkboard. They should be encouraged to look at the word, say it to themselves, remember it by its sound, and then write it without having to look back. They should be encouraged to use the sounds to help them remember the letters and their order in words. When they have learned to copy with two- or three-letter words, the teacher can gradually try to increase their memory span for words.

For students who are totally unable to complete seatwork from the chalkboard, work can be prepared on work sheets or in their books, or they can be required to provide brief answers only, so that they will not be penalized because of poor copying ability. When they have completed one- or two-word answers, they can then copy from the chalkboard as much as possible so that they may have the copying practice they need. It is advisable to provide students who have extreme difficulty in far-point copying with the textbook or a copy of the questions or sentences to be written. This eliminates the necessity for looking up and down when trying to copy.

Special attention should be paid to those students who show a distinct preference for the use of the left hand. These students should first of all be assured that it is quite acceptable for them to use the left hand, although in so doing they must use a slightly different approach from right-handers. Two things are of critical importance: (a) the pencil grasp, and (b) the position of the paper. The pencil grasp for left-handers is a mirror-image of that of right-handers. The pencil should be held between the thumb and middle finger, resting just below the first joint of the middle finger, with the index finger on top. The pencil should be grasped at the top of the sharpening, or about 2.5 cm from the lead end. When properly held, the end of the pencil will point over the left shoulder. The paper should be placed at an angle of sixty degrees to the right. A piece of masking tape may be affixed to the desk to indicate the appropriate slant for the paper in cursive writing. For printing, the paper should be parallel to the bottom of the desk. When pencil and paper are properly positioned, left-handed writers can see what they are writing and do not need to assume the "hooked" position that often becomes an entrenched habit, impossible to break.

If given proper instruction from the outset, the left-handed writer should be able to perform as effectively and efficiently as the right-handed writer. However, it is essential that the teacher be aware of the procedure and be able to demonstrate what to do. It may even require a little

practice on the part of the teacher to develop the left-hand writing position in order to instruct the student appropriately.

The following are some additional suggestions that teachers can use to help students improve their handwriting skills:

- For diagnostic purposes, the sentence "The quick brown fox jumps over the lazy dog" provides excellent practice since it includes every letter of the alphabet. The sentence is written or printed on the chalkboard, and the students are asked to copy it on their papers. Students are timed. Two or three minutes are allowed for completion, and the students are carefully observed as they print. It is important to compare far- and near-point copying.
- Tracing can be used to improve handwriting. First, someone with good handwriting skills puts words on the chalkboard in large letters using the broad side of the chalk. Students trace the word with their forefingers until the chalk disappears. The use of the whole arm from the shoulder is encouraged. If tenseness is evident, students are asked to make large circles on the board first, swinging from the shoulder. Over a period of time, the size of the letters is reduced until they are normal for chalk writing. Then words written very large on a piece of paper with a black felt pen are used. The students place another piece of paper on top of the first and trace with a pencil. (A free swing from the elbow should be encouraged.) Gradually the letters are reduced to a more normal size. If the students need to do tracing for spelling, the two skills can be combined. If not, subject-matter words can be used as the material to be traced. Students can also trace letter patterns with their index fingers on the chalkboard, in the air, on their desks, or on the teacher's sample in their books before they write the letters.
- Cutting, pasting, modelling, painting, drawing, solving mazes, working in dot-to-dot activity books, outlining, colouring, tracing, and working with templates or stencils can all be used to develop handwriting skills.
- The teacher should ensure that students grasp pencils and position paper properly. Students should be taught to move their books to the tops of their desks as their writing nears the bottom of the page. If more than their elbows are off the desk, they do not have proper support and control of their arms. The teacher should actively participate in every handwriting lesson, always checking while the student prints or writes to be sure of correct movement patterns.

- Students enjoy the opportunity to practise their handwriting at the chalkboard. This also allows the teacher to monitor their practice easily. It is recommended that the lower part of the chalkboard be permanently and appropriately lined. Students should be given only a half length of chalk, since it is easier to control than a full piece.
- Students can practise letter formation on large sheets of newsprint using large crayons, coloured pencils, or felt pens.
- To help students position their writing correctly, a coloured baseline can be provided to indicate where the letters sit. The teacher should point out that all lower-case letters in cursive writing begin with an upsweep at that line. Arrows can be used to show the direction of the movement. A green dot can be used to indicate the starting point and a red dot to indicate where to stop.
- When printing, students should be taught to print each letter in one continuous movement pattern. This will give them the feel of the letter.
- Desk or classroom reference cards can be provided for those letters that a student cannot remember.
- A variety of types of coloured and lined paper can be used to allow students the opportunity to experiment.
- Students should be taught to position their paper correctly for printing (parallel to the lower edge of the desk) and for writing (tilted approximately sixty degrees to the left for right-handers and sixty degrees to the right for left-handers). If students have difficulty with the slant of the paper, the teacher can affix a strip of masking tape to the desk parallel to the top of the paper.
- Students should be taught to grasp the pencil correctly between the thumb and middle finger, with the index finger riding on top of the pencil. The pencil should be held at the top of the sharpened part. A piece of tape around the pencil or the use of pencil grips will help the student remember where to hold the pencil.
- For students who have difficulty spacing, a spacer made of coloured paper about 1 cm square can be used. The student places a dot at the right edge of the spacer to indicate where the next word begins. Left-handed students have the greatest difficulty with spacing because it is difficult for them to use the right index finger as a spacer.

Mathematics

Learning problems and their diagnosis

Just as learning difficulties are experienced in the language arts areas, they also occur in the areas of arithmetic and mathematics. However, many learning difficulties in mathematics are the result of inappropriate teaching methodology, inability to determine the readiness of a student for a specific skill, overemphasis on rote learning rather than understanding, lack of attention to overlearning or mastery of one skill before another one is taught, and failure to teach the vocabulary of arithmetic and mathematics.

Students with learning disabilities who experience difficulties in mathematics may have difficulty with any of the following:

- concepts such as near-far, small-large, up-down, front-back, beginning-end, before-after, early-late, first-last, and those related to size, form, and time;
- the accurate duplication of such numbers as 3, 5, 7, 9, and 21, and the direction of addition, subtraction, multiplication, and division operations;
- the recognition and naming of not only the numerical symbols but also computational signs such as those indicating add, subtract, multiply, divide, greater than, and less than;
- the ordering of numbers as in counting and the steps applied to the calculation of a problem, whether it be a simple computational problem in addition or a more complex problem-solving situation;
- concepts such as more, less, how much, how long, how far, and how big. Students who improperly understand these concepts have difficulty determining whether they have more or less as a result of an operation and consequently find it difficult to know whether to add or subtract.

The language of mathematics itself is very specific and represents a major source of difficulty for the learning-disabled student. It contains terms that have special meanings (e.g., *sets*, *times*, *remainder*) as well as other terms (e.g., *product*, *sum*, *denominator*) that may also be a source of confusion. Many students are quite capable of performing mathematical calculations, but none the less have difficulty because they are unable to read the instructions for the problem. Textbooks at all levels include vocabulary and language constructions that are much beyond the grade level for which the material is intended. At the Intermediate and Senior grade levels some instructional time should be devoted to teaching students how to read in mathematics.

Although there are many formal and standardized assessment tests and surveys available, probably the best assessment procedure is observation. The following are some typical difficulties that are observed in students in Grades 3-7 who have been identified as having learning disabilities related to mathematics:

- In two-column addition, instead of adding the units' (ones') column and then the tens' column, students add all of the digits together as units.
- Simple addition or subtraction is begun at the left side instead of the right.
- In subtraction the smaller number is taken from the larger, regardless of position.
- Students show confusion when zero is encountered in any computation.
- Students are confused in two- or three-column addition when the units' column adds up to ten or more.
- Students are uncertain as to whether to add, subtract, multiply, or divide.
- Students are unable to correct a computational error.

Such problems can be diagnosed by determining the following:

- the errors the student is making;
- the student's reason for making the errors;
- what can be done to correct the problem.

In many cases, serious difficulties may be overcome by reteaching a basic concept that the student has not mastered.

An informal survey test can also be used to pinpoint weaknesses in basic computational skills. The survey test should represent examples, at each grade level, of the types of computation that the student is expected to master. A teacher who is well acquainted with the program at a specific grade level would have no difficulty constructing such a survey test.

Another diagnostic technique, called the "informal arithmetic inventory" (I.A.I.), was developed by W.P. Dunlap and A.H. Brennan.⁵ The I.A.I. resembles the informal reading inventory in its construction and emphasis. Its purpose is to determine students' needs and to place them at a point in the instructional program where these needs will be met. It consists of six components:

- addition of whole numbers
- subtraction of whole numbers

- multiplication of whole numbers
- division of whole numbers
- fractions
- decimals and per cent

Students are required to complete exercises of increasing difficulty within each of three basic areas: conceptual (Does the student understand the meaning of the operation?), computational (Can the student compute accurately?), and applications (Can the student use conceptual and computational skills to solve a problem?). Students are rated according to three performance levels:

- The *independent* level is the grade level at which the student correctly solves 90 per cent of the exercises.
- The *instructional* level is the grade level at which the student solves between 75 and 90 per cent of the exercises.
- The *frustration* level is the grade level at which the student solves less than 75 per cent of the exercises.

A series of texts for instruction in Kindergarten to Grade 6 is selected. One of the six components is chosen, and exercises that will represent the three basic areas (conceptual, computational, applications) are taken from the first three-quarters of the textbook at each grade level, as well as examples of new types of exercises at successive grade levels. Approximately thirty to thirty-six exercises are provided per grade level - ten exercises to measure conceptual skills, fifteen to twenty exercises to measure computational skills, and six exercises to measure application skills. Directions and reading skills are kept to a minimum, and an answer key, as well as a list of the skills being assessed, is constructed.

Only one component of the I.A.I. is administered at a time. The teacher begins testing about two grade levels below the student's present grade placement to determine the independent and instructional levels. Testing is continued until the frustration level is identified. A record sheet indicating a student's performance level (independent, instructional, frustration) is prepared for each of the three basic areas (concepts, computations, applications).

The results of the I.A.I. will indicate the level at which the student has mastery in each of the basic areas. It will also indicate whether a student's weakness lies in the conceptual area, the computational area, or the applications area.

5. W.P. Dunlap and A.H. Brennan, "Diagnosing Learning Difficulties, Via the I.A.I.", *Academic Therapy* 12:4 (1977), pp. 389-97.

From any one of the various possible diagnostic procedures the teacher can identify a student's areas of difficulty as well as his or her readiness for a specific skill. It is then the teacher's responsibility to use the diagnostic information to provide an instructional program that meets the student's learning needs.

Suggested teaching strategies

Instruction should begin with informal activities, involving games, hobbies, shared activities, turn-taking, and counting. Only concrete materials (blocks, beads, buttons, straws, coffee stirrers, marbles, dominoes, playing cards, Plasticine, etc.) should be used at first. Students should be taught to verbalize as they work.

Classroom charts approximately 50 cm square and containing addition or multiplication facts can be provided for student reference. Individual charts can be made for each student. Charts that indicate step-by-step procedures can also be provided; a green dot can be used above the numbers where an operation is to start, and an arrow included to indicate the direction of the work.

Most students can attend for a five- or ten-minute period but have difficulties with a longer twenty- or thirty-minute period. This problem can be solved by dividing the period into several segments. For example, a twenty-minute period can be treated as follows:

- five minutes devoted to a counting operation;
- five minutes devoted to the introduction of a new operation;
- ten minutes devoted to work-sheet problems.

In dividing lessons in this manner, it is possible to review concepts, as well as to sustain the attention of the student through the variety of activities and the pace of the lesson.

Multisensory activities are as effective in mathematics as they are in the language areas. For example, students can be taught to count in the following way: The number 1 is placed on a card, and a block is placed with it. The student makes a numeral 1 out of clay and then traces and says the clay number while looking at the block and number on the card. The procedure is then repeated with the number 2. Later, the word for the number is added. The student makes the word out of clay, traces it, and says it, all the while looking at the block(s) and the word for the number on the card.

Tracing can also be used to teach basic mathematics skills. For example, four basic number facts can be written in columns on a piece of paper with a black felt pen. (The content used should begin at the point the student has

reached.) Another piece of plain white paper is placed over the original one, and the student traces the number facts with a pencil, saying each problem and its answer aloud. The paper is moved to a clean spot repeatedly until the student has traced and said the set of four number facts eight or ten times. The student then writes the set of four number facts from memory on a clean piece of paper five or six times. At a subsequent session the student is required to write and say the four number facts in order and then to provide the answers out of order quickly and without having to think about it. If the student is successful, four new number facts are assigned, as well as some problems using the number facts already learned. Back-tracing is also effective in this activity.

Place value is a very basic concept that contributes to many difficulties in addition, subtraction, multiplication, and division when students do not understand it. Typically, they do not understand the meaning of *ten* and how it relates to units, or the meaning of *hundred* and how hundreds may be composed of *tens* or *ones*. Place value must be taught with concrete materials (e.g., straws, sticks, toothpicks). Students must see that ten sticks can be bundled together to make a *ten* and, alternatively, that the *ten* may be broken into ten units or ten ones. Only through this type of actual manipulation will students understand place value.

The following are some additional suggestions and strategies that have been found effective:

- A number line can be taped to each student's desk and its use taught.
- Students who have difficulty lining up figures in the appropriate column can use squared paper or a lined workbook turned so that the lines run vertically.
- Students should be taught to represent problems graphically or through the use of concrete objects.
- If students are allowed to distribute papers, books, pencils, and so on, they will see counting as a practical activity. They should also be taught how many more are needed (addition) or how many are left over (subtraction).
- Students who have problems with reversals (e.g., in answer to the problem $9 + 5 = 14$ they write $9 + 5 = 41$) can be asked to do arithmetic problems aloud.
- Grocery advertisements from newspapers should be used to make problems practical.
- Students should be told that a sign like the plus sign means *add* and *and* as well as *plus* (e.g., six plus seven, six and seven, six add seven).

- Students should understand the interrelationship and interchangeability of the basic processes (addition and subtraction, multiplication and division).
- When teaching addition facts, the doubles ($2 + 2 = 4, 3 + 3 = 6, 4 + 4 = 8, 5 + 5 = 10$) should be taught early.
- Adding nine, which always seems difficult, can be made easier if students are taught to add ten and then count back one. For example, when asked to add nine to eight, the student would say, "Ten plus eight equals eighteen, count back one equals seventeen. Nine plus eight equals seventeen."
- The five and ten times tables are perhaps the easiest multiplication tables to be learned and can be taught very effectively through the use of nickels and dimes, since working with money is generally motivating. One-cent pieces may be grouped in twos, threes, or fours to teach the other tables. If the reverse facts are taught at the same time, the memory load is reduced (e.g., $5 \times 2 = 10$ and $2 \times 5 = 10$).
- The signs greater than ($>$) and less than ($<$) have always caused confusion. Students should be taught to put two dots at the larger number (one dot at the top of the larger number and one dot at the bottom of it) and then one dot at the other smaller number. By pointing the one dot at the smaller number to each of the dots at the larger number, the direction of the sign is always correct (6:·3 and 5·:7). An alternative strategy is to teach the student that the mouth of the sign is always open to accept the larger number.
- Word problems are often difficult for students to understand. They can be asked to represent the problem by drawing a picture or by acting it out. The teacher should be sure that students know the vocabulary of any word problem.
- Monopoly is an excellent game to teach multiplication, division, interest, and per cent.
- Games like Snakes and Ladders and Parchesi can be used to reinforce addition facts if a pair of dice is used rather than just one die. Students have to add the numbers before they move.
- Snap played with two decks of playing cards, from which the face cards have been removed, is a good way of reinforcing the recognition of numerals and number groupings.
- A box of coloured felt shapes (e.g., squares, circles, rectangles, triangles) and copies of them cut into halves, quarters, thirds, and so on for matching purposes provides a good resource when fractions are taught. For example, students may be asked to find the parts to make the circle whole. When they become adept at finding and matching the parts to the whole, they are taught such names as *halves* and *quarters*.
- The following ideas should be emphasized: Adding means putting together; subtracting means taking away. Multiplication is a series of additions or a short way of adding; division is subtraction of equal groups. Students need to understand that if the answer is going to be larger, the operation must be addition or multiplication. If, on the other hand, the answer is going to be smaller, the operation must be subtraction or division.
- A student who is poor in mathematics but good in reading can be paired with one who is good in mathematics but poor in reading. This will be advantageous for both students.
- Young students can be provided with their own tutors: students from higher grades.
- When students make errors, the teacher should know what they are doing wrong, why, and that they know how to correct the errors. Students' work should always be checked so that the kinds of difficulties they are experiencing are known. If an error is common to a number of students, the lesson should be retaught.

- Students should be allowed to work at the chalkboard in groups so that the teacher can see at a glance what each student is doing and where each student's difficulty lies.
- The easiest means of performing an operation should always be the one that is taught. Students should not be confused by being taught alternative methods.
- The tachistoscope is useful for diagnosing difficulties in the basic math facts. It may be constructed from any type of rigid paper. The facts to be presented are placed on separate cards to be inserted into the card holder. One insert card might have addition facts, another subtraction facts, and so on. The teacher's record sheet has the same sets of facts in the same order, but beside them are columns headed *Flash* and *Analysis*. If the student responds within five seconds to the basic fact, it is checked in the *Flash* column. If the student is unable to respond correctly, a minus sign is recorded in the *Flash* column, and the basic fact is exposed for analysis. During the time the student is determining the answer, the teacher takes note of how the student arrives at the solution and makes comments to that effect.

ANSWER SHEET

	Flash	Analysis	Comments
$8 + 1$	_____	_____	_____
$5 + 4$	_____	_____	_____
$2 + 4$	_____	_____	_____

Visual and Performing Arts

The visual arts curriculum guideline for the Intermediate and Senior Divisions (Toronto: Ministry of Education, Ontario, 1984) states that the purposes for teaching the arts are no different for exceptional students than for any students. Visual and performing arts teachers believe that a great deal of emphasis should be given to these subject areas since many exceptional students cannot communicate well by any other means. The arts can improve not only the quality of the learning-disabled student's life but also his or her functional skills.

The function of the visual and performing arts in education is not to teach students to be artists. While it would be admirable if every student could be taught to appreciate good art and be a discriminating critic and consumer, one of the main functions of good arts programs must be to foster creativity. The ability to visualize mental imagery or use one's imagination seems to be basic to creativity. Although students who are gifted in the arts have an intuitive quality of imagination and often demonstrate a facility for depicting events, aspects of which have not existed before, the capacity to be creative is within the reach of everyone. Creativity can be blocked, however, by the fear of making mistakes, of being seen as a fool, of being criticized or misused, or of being excluded by the group. These factors should be carefully considered by classroom teachers, particularly those who teach learning-disabled students.

The visual and performing arts give students the opportunity for first-hand experience of the theatre, concert hall, or art gallery. Artists can in turn bring their expertise to students in the classroom. By expanding learning-disabled students' horizons in these ways teachers can considerably enhance their students' self-esteem.

The arts teach observation, memory and language development, and discrimination skills. They provide the learner not only with physical activity but also with cognitive stimulation. Experimentation in the arts satisfies the learning-disabled student's need to test hypotheses and provides outlets for natural curiosity and even for living vicariously. Students can learn by imitating, by predicting outcomes, and by just being with others.

Teaching the arts to exceptional pupils may pose challenges. These students may display a reluctance to participate in new or unusual activities. In other words, there is often a reluctance to leave the familiar for the unfamiliar. Once having taken the first steps in a new direction, they may need time to consolidate recently learned material before they are ready to become involved in new experiences. Teachers should be careful not

to confuse this with regression, since it is a necessary stage in the learning process for some special learners.

Teachers should treat every arts activity in a highly individualized manner, making sure that there is adequate provision for alternative activities. Students should be encouraged to discuss their work with each other and to help in classroom organization and in the planning of activities. Skills are taught most effectively when the task is broken down into its smallest component parts and handled in separate but sequential segments. Several short sessions of from three to twenty minutes often accomplish more than a session lasting an hour.

Recent research indicates a high correlation between aesthetic education and language acquisition. Cognitive skills involving the perception of similarities, differences, contiguities, and polarities are inherent in both fields of learning.

The arts should therefore be viewed not as ancillary to the education of learning-disabled students, but as an integral part of it.

Social Skills

Much has been written on the "second-order disturbances" that may develop in students with learning disabilities as a result of repeated failure experiences in school. A misunderstanding of the student on the teacher's part, or inappropriate teaching methods, may engender fears and feelings of worthlessness in the student. Such feelings may be expressed in avoidance and sometimes in rebellious and aggressive behaviour. Having learned to live with failure, such students may actually fear success, because it may lead to increased expectations that they are afraid they will not be able to fulfil. Some of them may react by becoming "victims", or "class clowns"; others may simply fade away, becoming the forgotten, "invisible" students in our schools. All these students need a caring and consistent teacher and individualized learning if they are to learn to trust and be successful.

The most effective teachers of reluctant learners are those who project a sense of genuineness, who are involved, who share themselves, and who assume that each student has dignity and worth. They understand that some students will need to "test" them to establish whether they really are genuine and worthy of trust. Sometimes this testing can be extensive and provocative, but the intent is always the same. The student is finding out if he or she is safe with this teacher in this classroom. Teachers should consult the support document *Behaviour* (Toronto: Ministry of Education, Ontario, 1986) for additional guidance in this area.

Teachers who provide the best learning conditions for students with learning disabilities are well-informed about the learning characteristics of each student, consistent in their expectations, predictable in their positive attitude towards their students and yet able to express disapproval when necessary by differentiating between the student and his or her actions. Comments like, "You're lazy," "You're not trying," or "You're a bad boy," are non-specific and can be damaging. Effective teachers are able to recognize that some students have difficulty making appropriate choices or are impulsive to such a degree that they are often unable to explore the available options to a specific line of behaviour. Teachers know, too, that these difficulties arise from an anxiety that encourages desperate responses, and therefore design their classrooms and activities around the principle of reducing anxiety by providing a consistent and structured learning environment in which students know what is expected of them. This allows the students to become freer to explore the range of options available to them and thereby to make more measured responses to situations.

The key to developing an anxiety-free classroom lies in teaching that is learner-based, individualized, consultative, and criterion-referenced. In this way the learner is centrally involved in the decision-making that affects his or her school work. Everything is discussed and shared on the basis of each student's cognitive and affective needs. This approach should in turn encourage such things as peer teaching. It is well established that students can learn as much from each other as they can from adults, so it makes sense for teachers to mobilize this powerful influence in the classroom on a carefully planned and organized basis.

Students with learning disabilities are often anxious and unwilling to attempt tasks at appropriate ability levels, easily frustrated, and quick to give up in difficult problem-solving situations. Their lack of self-confidence and inability to complete tasks are behaviours that they have learned over time. One solution to this problem is to teach learning-disabled students self-talk procedures (e.g., "I'm going to try this even if it's hard," "There must be a way," "I'll take it one part at a time"). This can increase their task persistence, their frustration tolerance, and their self-esteem.

In social situations, individuals scan their environment, focus on relevant cues, relate them to previous experiences, check the accuracy of their responses, and make necessary adjustments if their initial assumptions were faulty. This activity is ongoing and requires the making of swift judgements. While most people possess adequate ability to scan, judge, organize, and generalize, and therefore acquire these skills

intuitively, some learning-disabled students do not learn social behaviours unless they are explicitly taught them. Recently, there has been an emerging awareness of the fact that many learning-disabled students are socially disabled and that this cannot be blamed on school failure. The following are some of the problems that these students face:

- **Inability to interpret social roles.** The learning-disabled often do not understand that each individual plays many different roles in life. A woman may be a daughter, sister, wife, mother-in-law, aunt, niece, teacher, lecturer, neighbour, intimate friend, casual friend, supervisor, and employee. People often assume a role because others expect it of them. Depending on her children's needs, a mother may play the roles of parent, peer, or even child. To her own mother and father she may sometimes be daughter and occasionally parent. If she is a teacher, there are times when she is a fellow student. Most people are continually on the alert for subtle cues that tell them which role to play and when. They are skilled in reading which role the other person is playing, and they behave accordingly. Learning-disabled students, however, often have difficulty projecting a consistent image of themselves because they are unsure of their own strengths and weaknesses. As a result, other people are unsure of what to make of them and may end up avoiding them.

- **Emotional immaturity.** Being typically emotionally immature, many learning-disabled students in the preadolescent-to-adult age range are still egocentric. They interpret issues according to their own terms of reference rather than those of others. A thought may cross their minds and they may initiate a dialogue in mid-sentence, assuming that others share their thoughts.

- **Poor analytic skills.** Their poor analytic skills cause learning-disabled students not to notice when the faces and bodies of others signal weariness, frustration, anxiety, fear, humour, impatience, or a wish to be left alone. Failure to notice animate or inanimate cues often means that these students lack a means of understanding the needs of others for sympathy, support, solitude, and so on. Thus, these students are not very reinforcing as family members or friends, and as a result others may tend to seek their company less.

- **Shallowness of affect.** Most people, within certain limits, follow set patterns in their daily behaviour. They tend to seek efficient ways to

plan their day, prepare a meal, travel to work, and so on. There is a range of socially appropriate behaviours that people utilize for conversing with an employer, a job interviewer, a distant acquaintance, and so on. Those who know how to organize such experiences can imagine them in advance and plan their behaviour accordingly. Individuals who have not learned that experiences have an organization to them lack a repertoire of behaviours on which to draw. Thus, they are unsure of their social boundaries, and they may share too much intimate information with a passing stranger or, conversely, invest too little interest in someone very close to them. This is termed *shallowness of affect*.

- **Poor concept of time.** Individuals experience a feeling deeply only if they have adequate temporal concepts (i.e., they can visualize in terms of time). A situation will be humorous or sad to them only if they can perceive its implications in terms of the past and the future. Since some learning-disabled students function primarily from moment to moment, they may not experience some situations as deeply as others may expect them to.

- **Linguistic / conceptual difficulties.** Their linguistic / conceptual difficulties often cause learning-disabled students to interpret language literally or fail to notice inflections that alter meaning. For example, they might respond to "What *are* you doing!" as a question rather than as an exclamation. Students who interpret language literally, or process irrelevant parts of conversations because they focus in on inconsequential rather than critical words, must of necessity experience thought distortion. As well, an insufficient understanding of social expectations contributes to their poor judgement about how long to discuss a topic. Thus when they become involved in the discussion of a topic, some learning-disabled students may tend to be perseverative. Those who have not acquired a sophisticated, flexible use of language are unable to use it to bring others around to their point of view. At times their language causes them to be "put down" when they can least tolerate it.

Learning-disabled students whose behavioural repertoires are small will have a limited understanding of others. If they fail to realize that other people are behaving in response to their own behaviour (whining, anger, joy, frustration, etc.), they will be slow to alter or expand their range of behaviour.

Teaching strategies

One way to help students with interactional difficulties is to organize activity-centred programs involving peers. Such a program should include:

- a thorough task analysis of each participant's interactional difficulties;
- opportunities for peer interaction;
- some peers who are not learning-disabled (there are limits to the skills that students with social difficulties can impart to one another);
- activities that are not so engrossing that the students relate more to each activity than to each other (similarly, they should be discouraged from excessive interaction with the adults involved in the program);
- language used with students that is simple and direct (terms that may have more than one meaning should be avoided);
- an extensive emphasis on helping each student learn to organize his or her world;
- efforts to reduce students' undesirable behaviour while helping them to understand that they possess alternative behaviours in their repertoire;
- co-operation with other teachers to ensure that (a) behaviours that should be discouraged are not being reinforced, (b) other teachers make optimal use of situations that present themselves to promote social learning, (c) other teachers receive feedback on the quality of their work, and (d) materials are used as jumping-off points rather than ends in themselves.

A task analysis of interactional or social difficulties should determine whether the students:

- can identify and name another person's expressions of feelings;
- express their own feelings or displace them by withdrawing, by hyperactive behaviour, or by lashing out at the nearest available person;
- possess alternative behaviours for expressing delight, dissension, warmth, and so on;
- can bring others around to their point of view;
- can imagine how others are feeling in a variety of situations;
- are age-mature in conceptual ability;

- can imagine social events, describe them (e.g., going to the doctor, approaching a student to befriend, shopping, interviewing for a job, dating), and role-play them;

- notice those aspects of the body that express mood;
- know how to use their bodies when interacting with others (e.g., how close to stand to people, when to touch, hold hands, look sympathetic, what to do with their hands and feet);
- make assumptions about people from their hairstyles, posture, grooming, or clothing;
- understand the messages inherent in store windows and layouts, home furnishings, a large office with deep carpets, an impressive desk, a raised dais;
- understand relationships (e.g., what makes a person a grandparent, aunt, uncle, niece, nephew, in-law, step-relative, Mrs., Ms., Dr.);
- understand the stages of life and what individuals are capable of at each stage;
- can tell time and know the days of the week, months of the year, seasons, and holidays, and their sequence;
- share feelings with others or centre conversations on themselves;
- are concerned with the interests and feelings of others;
- express gratitude to people who have put themselves out for them;
- know when to stop talking, or still talk too loudly and are repetitious and rambling;
- recognize the impact of their behaviour on others;
- have learned the independence skills one would expect of students their age;
- can plan (organize) an afternoon or day with a friend.

Teachers should also consider the following suggestions⁶ to help students learn appropriate social behaviours in a non-threatening environment:

- Have students form a circle. Instruct them to select a physical attribute (hair colour, eye colour, etc.) of the person to their left and make an "I like" statement to that person. When everyone has had a turn, have students talk about how it feels to have someone say something nice about you in front of others. This

6. Adapted from Grey County Board of Education, *Learning Disabilities* (Markdale, Ontario, Grey County Board of Education, 1978).

activity can be repeated on subsequent occasions using specific characteristics ("I like the way Billy dances, sings, smiles, etc.") and non-physical attributes (sense of humour, generosity, gentleness, etc.).

- Provide students with brown mural paper and crayons. Choose one student each day to lie down and be traced by a classmate. Have the other students help colour in the student's portrait, keeping in mind specific body characteristics. On the figure, place important personal information – age, address, birth date, phone number, favourite subject, least-favourite subject, hobbies, and interests. Display each figure as it is finished.
- Cut smiling faces out of construction paper, leaving a space for writing. Give each student a face, and ask him or her to write a positive descriptive statement about the "student of the day" (the person chosen that day in the previous activity), e.g., "Tom always shares." The faces should then be placed on the student of the day's mural. At the end of the unit or week, allow the students to take home their individual murals with the positive statements.
- Obtain a scale and a metrestick. Divide the class into small groups and have the students weigh and measure each other. Place the results on a composite sheet. Compare likenesses and differences. Keep the atmosphere accepting of all differences, always directing the students' thinking towards the positive.
- Develop a learning centre by having the students bring in pictures of themselves as babies, as toddlers, and as they are now. Divide a bulletin board in half. Place the baby and toddler pictures on one side and the current pictures on the other side. Discuss as a group how everyone has grown and the changes that have taken place.
- Obtain an ink pad and paper. Have the students make prints of their fingers and compare them with the prints of others. It will be interesting to them to see that no two are alike.

- Provide small index cards and pencils. Pass out a card to each student, who then writes on it the statement "I am special." Place all of the cards on a table where the students can examine them. Ask them whether they can pick out their own writing. Discuss how handwriting is usually very distinctive to each person and how the handwriting of different people, although it may be similar, is never exactly alike.
- Provide a tape-recorder and a blank tape. Have each student read and record a poem or short paragraph. Play the tape and discuss different voice qualities (e.g., high, low, fast, slow, accented).
- Ask students to bring from home a variety of articles and pictures relating to their special interests. Designate a day for exploring individual interests. Have each student make a hat, depicting his or her particular interests, from construction paper to which suitable items are attached. Display the hats. Compare and discuss similarities and differences.
- Make an "I Can" bulletin board. Have each student cut out a large star from construction paper. On their own stars students write the things they feel they can do well (e.g., "I can climb a tree," "I can read a whole book in one night," "I can write a good story."). When the bulletin board is finished, students can share what they put on their stars. Then ask the students to suggest "I can . . ." statements about others. This provides positive feedback regarding individual achievements and enhances students' self-esteem.
- Prepare a duplicating master containing statements about feelings (e.g., "I feel angry when . . .", "I am scared when . . .", "My happiest time was when . . .", "I was excited when . . ."). When the students have finished completing the statements, have them form a circle and share what they have written.
- Provide writing paper and pencils. Instruct students to write riddles describing themselves. Read the clues for others to guess. An alternative activity would be to ask students to write clues (positive) about one person in the room. (This should be assigned so that no one is left out.) Then have all the students guess the answers.

- Provide index cards. Discuss with students the ways in which they have thought and talked about themselves for the last couple of weeks, then ask them to write statements of facts about themselves that others might not know. Statements can concentrate on the following categories: things I like to do; things I don't like to do; how I feel when . . .; my interests are . . .; people I like. This list can contain whatever is suitable for the class. The completed cards can be placed in an envelope and attached to each student's portrait to indicate that these are the "inside" things people might not know too easily.
- As the unit progresses, have the students add statements to their "Me" envelopes. Later, ask some of the students to bring their envelopes to the circle and share some of their "inside" statements.
- Provide large sheets of white paper, old magazines, paste, and scissors. Have students search through magazines looking for pictures that describe themselves. These pictures can be about likes, interests, hobbies, actions, or feelings. When they have gathered the pictures, ask each student to make a "Me" collage. Allow sharing time for each student to present his or her collage.
- Ask students to make a family tree on drawing paper, placing on the tree siblings, parents, grandparents, and so on. This activity strengthens the concept of belonging.
- Have students form a circle. Choose one student at a time and ask the other students for reasons why that student is important or helpful to the class. You may start things off when the first person is selected (e.g., "Johnny is important or helpful to our class because he is always on time and ready to begin"; "Susie is important because her smile makes us happy"). This may appear to be a high-risk activity, but if the class has experienced a lot of positive feedback over the preceding weeks, the students' statements can be pleasantly surprising.
- As a culminating activity, ask the students to write a "Me" story about what they have discovered or become aware of in the last month. The title might be: "What I have learned about me."

The following are two additional strategies that can be used to improve students' self-esteem:

- Send daily or weekly "one-liners" to parents about the positive achievements of their children. These can be in the form of telephone or written messages. It is most important that their intent and structure be discussed with the parents beforehand. Telephone one-liners might consist of "Good afternoon, Mr. or Mrs. —, I'm calling to let you know that John knew his multiplication facts to five today," or, "Jenny worked very hard to complete her reading work. Thank you, I'll be calling again."

- Write a short daily diary to each student. Students can be encouraged to write back or to initiate the interchange. The diaries are not intended to deal with serious problems. They are a means of social exchange between student and teacher. The following are two examples:

Example 1

Teacher writes:

I really like your new brooch.

You seemed a little unhappy today.

I hope you have fun at the fair on Saturday.

Student writes back:

Thank you. My grandmother gave it to me for my birthday.

We lost our dog last night and he hasn't come back yet.

I will!

Example 2

Student writes first:

I like your new shoes.

I went roller skating on the weekend.

Teacher writes back:

Thank you. It took ages for me to find them, but now I know it was worth it.

I bet you had a great time.

A program to match social-skills training to the specific social-skills needs of students with learning disabilities is in process at the Child Study Centre, University of Ottawa, at the time of publication. This program consists of a series of modules, each relating to some aspect (perceptual, cognitive, or observable) of social competence.

The first module deals with difficulties of social perception. Students who are diagnosed as having difficulties in this area are provided brief, direct training in identifying and understanding expressions and words that convey emotion. The social-cognition module contains procedures for teaching students that others may see situations from a different perspective than they do. Students who are diagnosed as withdrawn are given specific training in such skills as initiating social contact, making conversation, and making reasonable requests. Videotapes of socially successful students undertaking the same activities are used as models. Aggressive students are taught self-control by such methods as having them think of alternative solutions in irritating situations, and having them anticipate the long-term impact of their behaviour to postpone an explosive reaction until the provocation in question can be examined rationally.

The program is conducted in small groups made up of students who have been assessed as having similar difficulties. Some specific training is required for the group leaders; thus, the program should eventually be most useful to special-services personnel who have received instruction in its use.

The Child Study Centre has developed a resource bank of commercially produced social-skills training programs. For information on these programs and the Child Study Centre project contact:

Director
Child Study Centre
University of Ottawa
651 Cumberland Street
Ottawa, Ontario
K1N 6N5

The Integra Foundation also operates a specialized social-skills training program for students with learning disabilities. For details of this program and information on materials utilized by Integra (e.g., behaviour checklists and skill-training procedures) contact:

Director
Integra Foundation
25 Imperial Street
Toronto, Ontario
M5P 1C1

Special Needs of Secondary School Students

Student Characteristics

The characteristics of adolescents with learning disabilities are essentially the same as those of younger students. For example, they exhibit hyperactivity, although it may be limited to grimacing or tapping their fingers, pencils, or feet. Alternatively, adolescents may have learned to sublimate their hyperactivity so that their bodies appear tense and rigid. They are also demanding of attention and often exhibit noisy behaviour in the classroom. They often lack the social-interaction skills discussed in the last section. Their attention span remains shorter than that of their peers, they lack organizational skills, and their spelling and handwriting remain below average for their grade and age level. In general, they lack proficiency in language and mathematics skills.

Learning-disabled adolescents often disguise their difficulties by appearing to be generally uninterested in school, and consequently they are labelled as lazy, not trying hard enough, and unmotivated. Repeated academic failure is bound to result in other problems, e.g., depression, feelings of mental inferiority, damaged self-concept, a negative attitude towards themselves and society, and an inability to make accurate social perceptions and healthy adjustments at a time when those very qualities are important to the individual's maturation. Thus, at a time when they are trying to deal with the problems of identity and sexuality, social values and peer culture, and child-adult conflict, they may be overwhelmed by the addition of learning difficulties that are not being recognized or provided for.

The recognition of learning disabilities at the secondary level is a complex problem, because by this time adolescents have developed many secondary behaviours to conceal their perceived inadequacies. Thus, it is hard to determine whether a learning difficulty is the result of lack of interest, motivation, and application or the result of a true learning disability. To complicate

the identification problem, there are few tests at the secondary level that make it possible to differentiate learning abilities or disabilities. Perhaps a task-analysis approach is the best diagnostic procedure because it focuses on a specific problem area and yields information that provides the starting point for practical and relevant instructional procedures and materials.

At the secondary level, a significant discrepancy between ability and achievement levels seems to be generally accepted as the first criterion in the determination of a learning disability. This discrepancy is generally evident in (a) oral expression, (b) listening comprehension, (c) written comprehension, (d) basic reading, (e) reading comprehension, or (f) mathematics. According to some authorities, spelling problems are often a good indicator of learning disabilities.

Written expression, then, in the form of essays, notes, and assignments, is probably the best evidence of a learning disability because it shows the student's inability to organize and sequence his or her thoughts, to express those thoughts in a logical, coherent fashion, and physically to cope with the task of committing thoughts to paper. A spelling test, coupled with an example of both the student's creative writing and the student's written reconstruction of a story that has been read to him or her would provide the initial step in the diagnosis of a learning disability. The use of individual intelligence tests as well as tests of listening comprehension would provide an indication of a student's ability or capacity to achieve.

Some United States educators use the Lorge-Thorndike Intelligence Test as a diagnostic tool in this regard. Students having high discrepancy scores (the numerical difference between verbal IQ and non-verbal IQ) on the Lorge-Thorndike could be referred for further testing. This is practical information, since the Lorge-Thorndike is routinely used as a measure of intelligence in many schools and at different grade levels. Although to date there is no available research on

the use of the Canadian version of the Lorge-Thorndike as a screening instrument, it would seem profitable for teachers to look closely at students who show high discrepancies between their verbal and non-verbal IQ scores and to consider referring these students for further testing.

Program needs at the secondary level are very different from those at the elementary level. While programs for elementary learning-disabled students are developmental, it is generally accepted that the needs of the adolescent include compensatory assistance in academic skills, survival skills, and daily maintenance in the mainstream of school and society. In addition to the need for academic and career or vocational skills, adolescents have many needs related to the self. Most of all they need to feel good about themselves. In order to satisfy this need, adolescents must be provided with work or skills that they can perform well and the opportunity to develop any special talents that they may have. In some cases alternative school programs should be available to reinterest the student in learning and to provide opportunities for career or vocational training and talent development.

Socialization needs must also be addressed. Adolescents who, throughout the elementary grades, have experienced academic difficulties and successive failures and have developed undesirable behaviours are often rejected by parents, teachers, and peers. They become loners and stay on the periphery of social situations because of a general feeling of inadequacy. Adolescents with a specific language disability or with a disability in social perception often have poor conversational skills and a faulty perception of voice intonation or facial expression. As a result, they are often depressed and lack self-confidence. It is important that they be counselled into accepting situations in which they will acquire socialization skills and an enlarged self-esteem. Knowing what to do and how to do it, what to say and how to say it, and how to react or respond normally instead of aggressively or defensively will help a young person feel more comfortable and secure in social situations.

The following are some suggestions for providing the success experiences that these young people need:

- apprenticing them to an artist, runner, swimmer, cabinetmaker, dressmaker, tailor, gardener, plumber, mechanic, hairdresser, and so on;
- teaching them new things (e.g., to bowl, dance, cook, do make-up, play chess, play cricket, play field hockey);
- taking them places (e.g., on hikes, canoe trips, camping trips, to boat shows or races, to science fairs);
- involving them in activities (e.g., dramatic groups, orchestra, or basketball, hockey, or football teams), even if it means that they are needed only to check and look after equipment;
- making schools more attractive to them by accepting them as individuals with unique personalities and needs and by providing social and personal pursuits;
- providing alternative learning experiences where appropriate. The supervised alternative learning policy of the Ministry of Education provides the opportunity to release a student to engage in alternative learning experiences.

To provide this type of appropriate learning environment requires support for and from the home, society, and most of all the school. Teachers in secondary schools need to become more student-oriented rather than content-oriented. Teachers who work with students with learning disabilities need to be perceived by the students as people who are reliable and important. They can do this by showing their emotional and physical acceptance of the students, building and developing the students' self-concepts, establishing a learning environment that expects the most from the students and establishes clearly defined limits, and helping students to develop the social skills they need.

In summary, not only are the learning abilities and needs of adolescents very different from person to person but so also are their motivations and personal goals. Coping with the education of the adolescent with learning disabilities places considerable demands on special education personnel and especially on regular classroom teachers, who may not have been specifically trained to recognize, understand, or program for students with such unique needs. Close co-operation between special education and subject teachers is necessary, therefore, to promote a sensitive and responsive awareness of the adolescent's needs and to provide educational programs that will enable learning-disabled students to function effectively in a changing society. This may include co-operative education, since some learning difficulties, as well as emotional and behaviour problems, may be created by requiring students to stay in school full time to acquire academic skills when they might be more motivated and more successful if they were working for part of that time as apprentices in the area of their interests.

Designing Instructional Programs

Organizational concerns

In 1972, the Ministry of Education established the integration of all exceptional pupils (those with behavioural, intellectual, physical, and communication exceptionalities) within regular school programs as a major goal of special education. School boards were encouraged to provide programs to suit individual students with unique educational needs within the existing secondary school structure and even, with minor adjustments, within regular courses.

These aims and objectives are reinforced in *Ontario Schools, Intermediate and Senior Divisions, 1984*, which includes the following statements:

... The program in the publicly supported educational system should be designed to provide the greatest possible opportunity for every student to develop as completely as possible his / her abilities and interests and to meet each student's special needs. (p. 2)

It is a basic policy in the curriculum for Ontario that individual differences are to be accommodated to the greatest extent possible. Curriculum implementation must therefore involve careful and perceptive adaptation of courses and programs developed from curriculum guidelines, a constant awareness of standards, flexible organizational structures, and, for exceptional pupils, supportive special education programs and services. (p. 4)

Learning experiences must correspond with the pupil's needs, abilities, interests, and aspirations but may differ in content, process, product, and evaluation. Special education programs, therefore, will involve modifications to the kind, breadth, depth, and pace of these experiences. In some cases these modifications may be relatively simple; in other cases they will be more extensive. The assistance of additional professional staff and the use of specialized equipment or facilities may be required. (p. 6)

It is important that course choices for exceptional pupils in secondary schools be made from the most suitable combination of compulsory and optional credits. In order to facilitate this, the principal has been given considerable discretion in reducing the number of compulsory credits required for the OSSD . . . or for the Certificate of Education. (p. 6)

There is a core of secondary school students with learning difficulties whose problems were identified and for whom special education intervention was made at the elementary level. Although some may be able to manage successfully, there are many who, because of reading, writing, spell-

ing, or attentional difficulties, are unable to listen to and comprehend the usual forty-minute lecture-type lesson or to cope with the quantity of material to be read, notes to be taken, and essays and exams to be written. There are also many who, because of a type of perseverative mental set, find it extremely difficult to switch classes – to “turn off” science and then to “turn on” English literature. The organizational structure, which includes the design of the building itself and the timetabling arrangements, may also present major problems to students who have organizational difficulties.

In addition to these students there are others who, through compensatory mechanisms, have been able to mask their learning difficulties until the time when written examinations are required. A teacher may find at the end of an examination that a student who has participated in and contributed to class discussion is unable to pass a written examination.

To design instructional programs for adolescents with learning disabilities teachers require a basic understanding of what the program should do. Since the goal of education for adolescents with learning disabilities should be the same as for adolescents without learning difficulties, namely, to help each student to develop to the maximum his or her potential as an individual and as a member of society, consideration must be given to the following:

- arranging the environment to provide for continued learning;
- providing for the upgrading of academic skills;
- providing opportunities for not only academic but also career and vocational education;
- maintaining the student in the educational mainstream;
- developing an accepting and responsive attitude on the part of the total school staff.

Two models of special program delivery are operated in secondary schools for those learning-disabled students who require intensive help – the resource room and the special (self-contained) class. The fundamental difference between them is that the student attends the resource room on a part-time basis and remains for a good portion of the day in the regular classroom. Although the special-class model may be necessary for a limited number of adolescents with very severe learning difficulties, the resource-room model is preferred because it improves academic achievement and social behaviour; does not necessarily require costly psychological or psychiatric examinations and resultant time delay; does not result in a stigmatizing label; eliminates the problem of

reintegration; allows the learning-disabled student to attend regular classes for credit purposes; permits service to a larger number of children; and is administratively conducive to the individualization of regular instruction.

The programs in each of these models differ significantly because of the nature of the difficulties of the students involved. Resource-room programs focus on keeping students in the regular classroom and developing their academic skills so that they may graduate to postsecondary education or the job market. There is ample opportunity for program adjustments that will meet the needs of most students within the resource-room model. One recent and important development in Ontario is the provision of credit courses in the area of communications to suit the specific language needs of learning-disabled students within the resource room.

The focus of the self-contained class is to provide students with a functional level of basic skills and to teach them to capitalize on the areas of strength that may maximize their employment potential. Students enrolled in self-contained classes should be given opportunities to become part of the mainstream in those areas in which they have well-developed skills. For example, a student with musical abilities could become a contributing member of the school band.

The following five distinct approaches are currently being used to serve the needs of learning-disabled adolescents:

- Functional curriculum approach. This approach attempts to equip students to function in society. The regular curriculum of the secondary school is considered inappropriate for these students, most of whom are in self-contained classes. Thus, a new curriculum is devised to meet the student's basic needs – consumer information, how to fill out applications, and survival skills that will prepare them for the world of work rather than school. Guidance and counselling with respect to the student's self-identity, as well as career and vocational identity, are major components of this approach.

- Basic-skills remediation approach. This approach attempts to provide remedial instruction in basic-skills deficits in reading and mathematics. Remedial programs similar to those found in elementary schools are used. Although basic-skill instruction is important and should increase literacy, the limited time available for remedial instruction may not change a student's level very significantly. An emphasis is placed on teaching students adaptive strategies to compensate for the skills they lack.

- Tutorial approach. This approach attempts to provide instruction in academic areas. The primary responsibility of the special learning-disabilities teacher is to help students with course content so that they may remain in the regular classroom and meet the requirements set by the teacher.

- Work-study approach. This approach attempts to provide students with instruction in job and career-related skills, including on-the-job experiences. The work-study approach is appropriate for those for whom the regular curriculum is judged inappropriate. Students attend school for half the day and spend the other half of each day on the job. School time is devoted to developing academic skills – reading, writing, spelling, and mathematics – related to the use of career or vocational materials such as forms, instructions, letters, symbols, newspapers, and advertising. Guidance and counselling are necessary components to provide students with information and know-how as well as to assist in placement.

- Learning-strategies approach. This approach attempts to teach students how to learn rather than to teach them specific content. For the learning-disabled student who may have the potential for postsecondary (including college) education this approach is critical, because students are taught how best to use their abilities as well as specific strategies to cope with regular curriculum content.

While they may prefer one approach over another, competent resource or learning-disabilities teachers implement whatever approach best meets the needs of each student. They are also:

- informed about the many types of problems encountered by the adolescent with learning disabilities;
- able to respond to those needs through the instructional strategy, instructional environment, and learning materials;
- familiar with the entire curriculum so that they can assist regular classroom teachers in the use of specific strategies or techniques and can themselves teach students who need help;
- able to work co-operatively with subject teachers, helping them while not appearing critical of them;
- aware of the problems of, and the constraints on, the teacher in the regular classroom of thirty or more students;

- able to conduct an initial screening to determine students' learning needs and to serve as members of placement teams that determine appropriate instructional programs.

An analysis of the preceding information should enable special education teachers to organize an environment in which students can maximize their opportunities for academic, career, or vocational education. The organizational framework must include provisions for individualizing the timetable for each student so that courses are followed at the appropriate level. Another organizational feature is to schedule a regular period in the resource room for students with learning disabilities. "Regular" may mean daily or twice or three times per week, depending on the nature and severity of the student's learning difficulties. It is often wise to encourage students to take a reduced course load to allow for a regular daily period with the special education or resource teacher (seven courses instead of the usual eight). In addition to scheduling students for regular resource-room periods, teachers may need to organize half-day programs for some students in nearby vocational or technical schools, or, alternatively, set up half-day apprenticeship programs with trades and business people.

In order to integrate a student with learning disabilities successfully, receiving classroom teachers require from the resource or previous classroom teacher a brief outline of the student's abilities and needs with an accompanying interpretation of their implications for course modification. The following is an example of one such student report:

Michael K. (17)

Stanford Spelling	5.6
Sherman-Monroe Spelling	6.4
Gray Oral Reading	3.8
Sherman-Monroe Silent Reading	6.9
Paragraph meaning	8.0
Reading speed	6.9
Word discrimination	5.8

Overall these results reflect Michael's everyday reading and spelling skills.

Implications and Specific Recommendations

Reading

Silent reading: Michael shows competence in this area, but it does take him longer than students without a specific learning disability. Therefore, extra time for reading and the provision of taped novels will aid his comprehension and ability to keep up with the rest of the class.

Oral reading: Michael has real fears about being asked to stand up and read in front of the class. As can be seen from his test results, his oral reading is very poor in accuracy (3.8) when compared to his comprehension when reading silently at the Grade 8 equivalent.

Word discrimination: This ability is also weak and could give Michael very real problems when writing exams and in-class tests. He may misinterpret individual words and then write an answer that is completely off topic. If he could write exams and tests in the resource room with either the resource teacher available to assist him in the actual reading of the questions, or the exam or test questions taped so that he has a means of double-checking his reading, much misunderstanding and possible failure could be eliminated.

Writing

Michael appears to be able to keep up with written work, such as copying notes from the board, rewriting notes as homework, and completing all written exercises, except that he has a problem in making notes from an oral presentation, that is, a lecture-type format. Therefore, if another student could use pressure-sensitive notepaper or carbon paper to produce a copy of his or her notes, Michael would be able to make his own notes and still have the security of checking them against someone else's notes. In this way he would be able to handle all written assignments.

Spelling

Michael will probably need proofreading support from the resource teacher for his assignments, as his basic spelling is satisfactory but he has problems with words that are more than two syllables in length. Michael is a very independent worker and finds it difficult to "risk" new strategies.

Social

Michael's lack of facility in word discrimination causes him difficulty both in reading and in interpreting what other people say to him. Key words are often not perceived accurately. This misinterpretation often alters the meaning of the intended message.

General teaching suggestions

Teaching secondary students with learning disabilities should be task-specific. This may take the form of concentrating on the vocabulary of a particular subject or story so that students can pronounce and read the words correctly as well as understand their meaning, or it may take the form of spelling instruction directed towards the accurate written spelling of high-frequency words.

A variety of teaching methods may be used. Some, such as the Orton-Gillingham and the Fernald approaches, teach students to use a multisensory approach in their efforts to attain mastery learning. The rehearsal technique reinforces learning through vocalizing or saying aloud what is read, seen, or heard. Teaching students to make notes as they read is an aid to reading comprehension. The use of techniques such as these will enable students to overcome or bypass their learning difficulties and give them strategies that they may apply in new learning situations.

There are also many specific things that teachers can do to provide help to learning-disabled students. For students who have general difficulties, teachers should check to see that the students understand assignments as well as lesson materials and should clarify the intent of assignments as well as the manner in which responses are to be recorded. This may be all that is required. On the other hand, students may not have understood a lesson because they lacked prerequisite skills or because the lesson was poorly presented. In these cases the lesson will need to be retaught using an analytic approach to the problem. Students should also receive help in organizing their homework, essays, assignments, and so on, and should be provided with a quiet place in which to complete assignments without disruption.

Students with reading difficulties should be taught the vocabulary and language structure of each subject (especially mathematics and science), as well as difficult or unfamiliar words. They should also read question material before they read the text. The teacher can provide further help by doing the following:

- preparing a guide or outline indicating the specific information that is required from a reading assignment;
- teaching students to read in order to answer who, what, where, when, and why questions;
- teaching students to make maximum use of chapter summaries, headings, bold-face type, topic sentences, glossaries, indexes, and tables of contents;
- reading texts to students and having them answer orally. Responses may be recorded on tape or by another student. Other students and volunteers can provide a valuable service in this area;
- recording reading materials (texts, novels, plays, etc.) on tape. Volunteers can be used to build up a taped library of books for use, for example, in an English course;

- providing high-interest, low-vocabulary texts when appropriate. An evaluation of materials of this type may be found in *Special Education Materials and Resources Handbook* (Toronto: Ministry of Education, Ontario, 1982);

- using audio-visual aids to supplement lessons.

Students with spelling or handwriting difficulties should be encouraged to participate orally in class and should be given written assignments within their level of proficiency and potential. They should be allowed to write their notes in point form rather than in sentences and should be allowed to submit their assignments or reports orally or on tape.

Typing facilities should be provided for students whose written work is illegible and, if possible, students should be taught to type.

With students who have difficulties in mathematics, teachers should use a task-analysis approach, since mathematics skills are easily identifiable. Such students require a basic course in mathematics that includes day-to-day needs (totalling bills, making change, balancing accounts, etc.). Students who have organizational, directional, or memory difficulties should be allowed to use tables, charts, calculators, and so on. Adding machines, or calculators with print-outs, can be especially helpful to some students since they provide a written record of the operations undertaken in solving a problem.

The use of tape-recorded materials should be carefully considered with students who have language difficulties. For example, students can be permitted to submit their essays on tapes instead of on paper. In this case, the essay's preparation, organization, and use of vocabulary and correct syntax are all exactly the same as if the finished assignment were written. The only difference is that instead of going through the mechanics of writing, copying, and spelling, the student conveys meaning through oral expression.

When asking students to listen to pretaped material, such as talking books, it is essential that their listening be *directed*. For example, two or three questions given ahead of reading the opening chapters will enable a student to be aware of the most important facts. If outlining or note taking is required at the end of each chapter, the student will be encouraged to be an active listener and, as a bonus, he or she will have a record of the main points in the order in which they occurred as a reference for follow-up assignments and tests.

While their use should be rare, correspondence programs can be invaluable to a learning-disabled student. Students who have been in special education programs for a number of years

may lack the technical and conceptual background necessary for success in a particular subject at the secondary level. The finely structured correspondence program permits the resource teacher to act as a tutor for a single course to ensure that the student has the necessary competence and confidence to take subsequent courses in the regular program. The correspondence program can also provide the resource teacher with a first-hand knowledge of the student's individual strengths, needs, and difficulties, as well as the strategies that worked while the student took the course. As a result, specific and efficient resource support can subsequently be provided for both the student and the regular course teachers.

Frequently, one of the major problems for students with learning disabilities is written examinations. In fact, this may be the teacher's first indication of a learning disability. Since students with learning disabilities are often notoriously poor spellers, the value of the content of an examination is diminished significantly when marks are deducted for spelling errors. If, for example, a student has demonstrated that he or she knows the subject content on a geography examination, spelling errors should be overlooked.

Students with learning disabilities, especially those related to organizational and time concepts, need counselling in how to prepare for examinations. They must know how to organize their material for studying, how to set up a study timetable for themselves, and how to study for and write an examination. These students should be provided with some understanding of the scope of the examination, the length of time given, the type of question asked, and the expected response. Other examination considerations for students with learning disabilities include the following:

- accepting point-form answers where possible;
- extending the time allowed to complete the examinations;
- providing a quiet place for the student to write;
- reading questions to the student or having the questions recorded on tape;
- allowing answers to be tape-recorded;
- providing oral examinations for severely learning-disabled students;
- accepting oral contributions or project work.

It is possible, then, within the context of a secondary school, to provide an environment for students with learning disabilities that will allow these students to make the most of their learning abilities. Through the co-operation of staff members, vocational or technical schools, and industrial and tradespeople, it is possible for teachers to provide a variety of program options that will motivate learning-disabled students to continue learning and give them the satisfaction of knowing that there are things they can do successfully. The operation of a successful program requires a teacher who understands the problems of adolescence and especially the problems of the adolescent with learning disabilities. The teacher must individualize instruction to provide the necessary arrangements and adaptations that are required for appropriate programming to capitalize on the learner's strengths.

The Learning-Strategies Approach⁷

The demands that adolescents with learning disabilities encounter are very different from those that younger children face. To be successful in a secondary school setting, learning-disabled adolescents must possess a wide array of strategies (both organizational and practical) that will allow them to function independently and effectively. Since instruction is mainly unidirectional and presented in a lecture format, students must possess sophisticated listening, note-taking, attending, and problem-solving skills. If students are not asked to demonstrate their knowledge orally, heavy demands are placed on their writing skills, which are often weak.

Learning-disabled adolescents lack the skills necessary to learn and perform independently. They exhibit immature executive functioning and deficiencies in their study skills, learning strategies, and social skills. The learning-strategies approach was developed to provide students with the skills they lack and thus equip them to make the transition from secondary school to postsecondary education and the world of work. It concentrates, therefore, on teaching students how to learn (i.e., improving their cognitive efficiency) rather than on teaching them specific content. It should be emphasized, however, that the learning-strategies approach is not intended to supplant remediation. It is one further, albeit essential, component of the overall approach to

7. Many of the ideas in this and the following sections are derived from G. R. Alley and D. D. Deshler, *Teaching the Learning Disabled Adolescent: Strategies and Methods* (Denver, Colo.: Love, 1979). Dr. Deshler is also the director of the Institute for Research in Learning Disabilities at the University of Kansas. A list of the institute's eighty publications may be obtained on request from the institute at 312 Carruth O'Leary, Lawrence, Kansas 66045.

providing appropriate instruction for students with learning disabilities.

The learning-strategies approach consists of techniques, principles, or rules that facilitate the acquisition, manipulation, storage, and retrieval of information across situations and settings. The necessity for such an approach results from the demands (especially the complex language demands) of the secondary school curriculum and from past experience, which has shown that basic academic remediation is not sufficient for secondary school students. The strategies are designed to assist students in three major areas:

- gaining information from written material (reading);
- expressing information in writing; and
- gaining information from oral material (listening).

The work of Dr. D. Deshler, Director of the Institute for Research in Learning Disabilities at the University of Kansas, has led to the evolution of a *strategies intervention model*. The model consists of the following three components and their subcomponents:

- *curriculum component*: task-specific learning strategies, executive strategies, social-skill strategies, motivation strategies, transition strategies;
- *instructional component*: acquisition procedures, generalization procedures, maintenance procedures, group-instructional procedures, material- and instruction-modification procedures;
- *organizational component*: communication procedures, management procedures, evaluation procedures, teacher-training and adoption procedures.

The strength of the model lies more in the collective nature of the overall system than in any one component. Thus, all of the subcomponents are essential to its success.

In using a learning-strategies approach, teachers can help learning-disabled students to face the challenges of secondary school and to acquire learning strategies in the following ways:

- making presentations that involve students in discussion through questioning rather than lecturing only;
- presenting advance organizers that might help students to listen more efficiently (e.g., the topic and any new vocabulary written on the board at the beginning of the session);
- checking to ensure that students understand directions;
- providing feedback about student performance more frequently than is usual in secondary schools;
- asking more of the five *W* questions about content rather than giving or stating facts and opinions;
- ensuring that information or questions are presented clearly and simply so that students do not become lost in processing the information;
- using more class discussion and audio-visual aids and providing more opportunities for group work and hands-on experiences;
- encouraging students to request help or answer questions. Through the use of a question period in each class, students can be taught to phrase questions and answers;
- organizing students to ask questions or make comments during lectures;
- asking questions of, making suggestions to, and giving verbal feedback to learning-disabled students about their work;
- adjusting classroom presentations to the levels of reading, writing, oral-language, and listening skills that the students have developed to that point, and avoiding placing heavy demands on those skills during classroom instruction.

In addition, teachers can help their students to master the following ten specific learning strategies:

1. **TOWER.** This strategy for essay writing is based on the following operations:
 - **T**hink (put down the facts)
 - **O**rder (number the facts in order)
 - **W**rite (write the essay or paper)
 - **E**dit
 - **R**ewrite

a) The teacher discusses with students the frustrations they have when writing essays. He or she then demonstrates and discusses the TOWER plan, using the following worksheet:

TOWER WORKSHEET

- THINK** – put down the facts
- ORDER** – number in order
- WRITE** – essay or paper
- EDIT** – proofread
- REWRITE** – final copy

b) A short, simple topic of general interest to students (e.g., Organized Sport in Canada, or My Three Favourite Television Shows) is selected and students are asked to supply verbally the information needed to complete the TOWER plan.

Using a prepared overhead, the teacher models the strategy for the students. This involves filling in the topic and subtopics; listing the facts that will support the subtopics; checking to see if there are enough facts to support a paragraph for each subtopic (If there are not enough facts for a particular subtopic, the subtopic is crossed out and ignored, or, if short of material, students research for more facts and then complete the plan.); numbering the subtopics in the order in which they are to be used; writing the introductory paragraph (including the topic, an opinion, and the subtopics in the order in which they will be found in the body of the essay); writing the rough copy on every other line; proof-reading (using the COPS strategy, described below, if necessary); and writing a neat, final copy. Note that at this stage the teacher does all of the writing.

- c) Students verbally rehearse the steps needed to complete the TOWER plan.
- d) Students experiment in completing the TOWER outline as previously described using a variety of topics that interest them. At this stage, only the plans are being completed. The actual essay writing comes later.
- e) Students select one of the topics for which they have prepared a TOWER plan and then write their essays. The teacher provides as much positive, reinforcing feedback as possible throughout each step of this stage. This process should be repeated with other short, simple topics until mastery is achieved. The complexity and level of difficulty is increased by the use of examples of regular classroom essay topics in a variety of subjects (old exam questions are ideal) and the provision of opportunities for practice. Essays assigned in the regular class and for homework can be used to put the TOWER plan to use as an everyday strategy. The teacher should provide a great deal of positive feedback at each trial.

f) The teacher provides a post-test. This will probably take the form of a discussion of the reality of the following: the improvements noted in the marks obtained in the regular class essays; the reduction of the time needed for recopying; the decrease in the tension created by essay writing; the increased confidence on the part of the students that results in a much more positive attitude.

2. *Mapping.* This strategy is used to improve personal study skills (e.g., reviewing, organizing material, summarizing, planning for writing). In mapping, the main idea, topic, or concept is represented visually in a central spot with supporting data placed around it in point form as in the following example, taken from E. N. Askov and K. Kamm in their book *Study Skills in the Content Areas* (Allyn and Bacon, 1982).

b) The idea of mapping is then introduced by selecting an easy, concrete comprehension passage that the students have already studied. Through questioning, the teacher elicits the topic from students and draws a rough picture of it on the chalkboard. The teacher continues to ask for supporting details and places them in point form, *in as few words as possible*, around the topic picture. Students are then asked to copy this first attempt at mapping in their own books.

c) The procedure is repeated with the students volunteering to write and draw the information on the board while the teacher verbalizes and guides the process through questioning and positive feedback.

d) The whole process is repeated, first by the students on their own and then with a composite mapping recorded on the board as a check and as a basis for a discussion of any of the difficulties that may have arisen.

e) Students are now ready to follow through the whole process independently, but still using basic comprehension passages.

f) Once mastery of this controlled material has been achieved, then regular class passages should be used as the basis for mapping. Regular feedback is still an essential ingredient at this point. This will also encourage a sharing of ideas and supportive behaviour among students.

g) A post-test may consist of a discussion of the value of the visual layout of the students' notes in enhancing comprehension and recall.

Mapping can be used for daily review, since any new material presented in a class can be mapped in about ten minutes that evening for homework. This enables students to:

- reprocess the material;
- check that they understand it;
- have immediate feedback if something is missing or has been misunderstood so that immediate follow-up can occur between the student and the teacher during the very next lesson.

The visual picture helps students to understand relationships, and this aids their retention of the material. Because mapping is a multisensory procedure combining graphic and verbal qualities, it has been particularly effective with students with learning disabilities, especially those with creative ability.

a) To introduce mapping the teacher presents students with a series of short passages based on topics of general knowledge. The students use these to develop mastery in finding the main idea and supporting details.

It can also be used to develop long-term memory. In preparation for tests and exams, the mapped material is organized so that the student can:

- refer to personally well-organized material from which to work on assignments;
- study for exams and tests independently by just referring to the visual representation or by passing the mapping to a helper, such as a friend or parent, who can actively assist in the recall and studying process because the material is well-organized and right in front of them.

Mapping can be used for the reproduction of notes. When a student needs a note taker, it is usually a waste of the student's time simply to copy out the notes, as they are, for homework. No active mental effort is needed and the process usually takes a very long time. If a student is required to map the notes, it will encourage active mental effort and will demonstrate whether he or she has understood the material, as well as being far more economical in terms of time – a vital concern for learning-disabled students.

Finally, mapping is an excellent preparation for writing. Whether writing a paragraph or an essay, the student can use mapping as a speedy but well-organized method of planning. If numbering the points in the order they are to be used is added to the basic mapping procedure, a rough copy can be written directly from this mapping.

3. **COPS.** This strategy provides a systematic method of proofreading, once a rough copy has been completed. It involves checking for errors in the following areas:

- **Capitals**
- **Overall presentation**
- **Punctuation**
- **Spelling**

Note that "overall presentation" can mean different things according to the needs of individual students (e.g., indenting, touching the margin, underlining, date).

4. **Multipass.** This strategy is used to gain information from large quantities of reading material. It consists of having the reader make multiple passes through reading material with specific goals for each pass, for example:

- for titles and subtitles (these can be turned into questions);
- to study pictures, charts, diagrams, and graphs;
- to study the organization of material and its placement within the whole text;
- to read the introductory paragraph;
- to read only the first sentence of all the remaining paragraphs;
- to read the concluding paragraph;
- to read the passage through from beginning to end.

Students should be helped to design their own multipass strategy in terms of their specific needs.

If an old textbook can be obtained, or a specific section photocopied, a poor or slow reader can use a highlighting pen to mark all of the important points so that they can be found easily when the follow-up assignment has to be completed.

5. **SCORER.** This test-taking strategy involves the following steps:

- **Schedule your time.**
- **Clue words.**
- **Omit difficult questions.**
- **Read carefully.**
- **Estimate your answer.**
- **Review your work.**

Students have been shown to improve by 15 to 20 per cent on their tests after using SCORER.

6. **Self-questioning.** This strategy develops active reading skills. Students ask the five *W* questions (why, when, what, who, where) as they read, pencilling the appropriate cues in the margin. They then read the questions to be answered on the text and refer back to the appropriate cues in the margin.

7. **WIS (word-identification strategy).** This strategy is an alternative to phonics. It provides students with some help if they cannot identify a word. WIS involves the following steps:

- Read the rest of the sentence (context).
- Look for a prefix (and get rid of it; the word might then become recognizable).
- Look for a suffix (and get rid of it; the word might then become recognizable).
- Use the rule of twos and threes in syllabification: if a word or syllable begins with a vowel, take two letters at a time (e.g., av/al/an/che); if not, take three letters at a time (e.g., dic/tio/nar/y).
- Drop the first letter in words like s/win/dle.
- Look in a dictionary.
- Ask someone for help.

8. **RAP.** This strategy involves paraphrasing as follows:

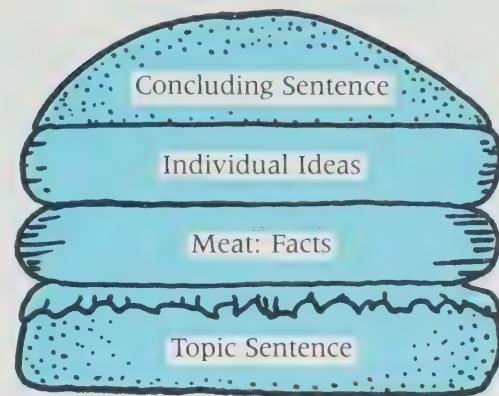
- Read one paragraph.
- Ask yourself what you have just read.
- Put it into your own words (paraphrase).

9. **Paragraph writing.** This organizational strategy involves the following steps:

- Write a topic sentence.
- Write three descriptive sentences.
- Write a clincher.

To make this more visual for students, the paragraph may be compared to a hamburger. Basically every hamburger is prepared in the same way: from the bottom up. However, different ingredients can make it more enjoyable for each individual. The following

diagram illustrates how this applies to the paragraph:



In order to write a good paragraph the writer must first plan it (the ingredients must be collected and prepared), and only then can the paragraph be put together (written). The following outline can be used to illustrate paragraph construction:

PARAGRAPH PLAN

Topic: _____

Topic sentence _____

Ideas and Facts a)
b)
c)

Concluding sentence _____

10. **Reciprocal questioning.** This strategy helps students to learn to read thoughtfully. It involves the following steps:

- Students and teacher read a passage silently.
- Students ask questions and the teacher answers.
- The preceding procedure is reversed (modelling).
- This is repeated with subsequent paragraphs. As a result of this process, the frequency and variety of questions asked by students increase as does students' reading comprehension.

Strategies for Coping With Specific Reading and Writing Difficulties

The following material outlines specific learning difficulties in the areas of reading and writing and some suggested strategies for dealing with them.

Difficulties	Strategies
1. Reading	
A. <i>Oral.</i> A student may be very reluctant or refuse to read aloud in class. This may indicate a genuine disability (many learning-disabled students read orally at least two grades below their silent reading level), or it may be due to a lack of confidence in a new setting, or the student may have a speech impediment when under tension.	If oral reading reports are a part of the course, depending on the individual situation, the teacher can: give the student the passage ahead of time so that it can be prepared reading rather than sight reading; arrange a time when the reading can be done privately; or permit the presentation to be prepared ahead of time, put on tape, and brought to class and played.
B. <i>Independent study.</i> A student may still be slow and uncertain when reading alone as a result of a slow reading rate, or uncertainty over whether what is understood is really what was written (interpretation and lack of confidence), or a misinterpretation of lengthy or unfamiliar words.	<p>The teacher can:</p> <ul style="list-style-type: none">– develop self-questioning skills;– use the Multipass strategy described above;– tape lengthy reading material;– provide plenty of <i>time</i> by giving the student the texts (especially novels and short stories) in advance, such as at the beginning of the summer holidays, so that the reading can be prepared ahead of time, and by allowing at least a weekend over which to read a short story;– prepare reading material from textbooks in which the main points and new vocabulary have been highlighted so that the student is confident of the main facts;– teach the student to scan and to use different rates of reading (e.g., level III of the NASSP <i>Study Skills Program</i> (Reston, Virginia: National Association of Secondary School Principals, 1980).
C. <i>Instructions.</i> Some students have difficulty in handling more than one instruction at a time. Therefore, independent research projects can present problems.	<p>N.B. Handwritten ditto sheets present a real problem for the poor reader. Typed question papers or fact sheets, which can often be prepared either in the business practice office or in the resource room if the teacher does not have access to a typewriter, greatly aid students' ability to cope independently.</p> <p>Clear, step-by-step instructions presented on a typed ditto sheet enable the learning-disabled student to function independently and to do a good job.</p>

Difficulties

Strategies

2. Writing

A. *Essays and assignments* (time not enough); *organization* (no structure to student's work); *spelling and presentation* (sloppy and untidy). These may each be specific problem areas for the learning-disabled student.

A reasonable amount of time must be allowed for the student to collect information, to organize material, to have the rough draft proofread, and to write, type, tape, or word-process the final copy if the student is to achieve his or her highest potential. Also, the student may be physically slow in the actual motor act of writing, especially if he or she is left-handed. Note that many learning-disabled adolescents require more than twice the time allotted on the Monroe-Sherman copying test.

The following organizational aids (described above) can be used: TOWER, Mapping, Paragraph Writing.

An opportunity to work out the organization with the subject teacher is invaluable.

For spelling, proofreading by a third party is vital. However, if this is not possible, as in a test or an exam, photocopying the assignment, marking the original for factual or creative content only, and then marking the photocopy for writing errors will enable the student to realize that both his or her intellectual ability and writing-skills difficulty have been acknowledged. This usually leads the student to trust the teacher and, as a result, to work as hard and achieve as much as possible, both academically and behaviourally.

Robert Dixon and Siegfried Engelmann's *Corrective Spelling Through Morphographs* (Toronto and Chicago: Science Research Associates, 1979) can be of practical value to the poor speller who is sound in phonics but is unable to spell or to decode words of more than two syllables.

In terms of presentation the teacher should realize that a sloppy, scruffy paper may not be an indication of a poor attitude or a hurried assignment, but may, in fact, be the result of a spatial difficulty. This can be readily verified by referring to the psychological testing results. Such information should be noted, recorded, and passed on by the resource teacher to the receiving subject teachers.

Erasable pens can be of great help to many students, particularly those who are poor spellers or copiers, in achieving a higher standard of presentation. Some students find that ballpoint pens run away with them and that pencils and erasable pens help them to produce neater presentations because they grip the paper better.

Difficulties

Strategies

2. **Writing** (cont'd.)

B. *Tests and exams.* Tension, insufficient time, poor ability to read and interpret questions, and poor spelling and writing skills can all cause difficulties for the learning-disabled student and can result in a very deflated, if not a failing, mark.

Tension is to be expected if it is remembered that learning-disabled students may have spent many of the previous school years in a special education setting in which they probably were not exposed to tests or exams. Therefore, the entire process must be explained and strategies practised, both in the resource room and in the regular classroom, if these students are to cope.

Untimed tests and exams permit a much fairer evaluation of students' knowledge and expertise. This applies to most students in a regular class, not just to exceptional students. However, if untimed tests or exams are impractical for the whole class, then the student who needs extra time should be permitted to write the exam or test in the resource room at the same time as the rest of the class, and under the supervision of the resource-room staff. Sometimes the use of a "secretary" (a resource room writer) is the best means of providing an efficient and accurate written record of the student's answers.

Two methods of successfully managing the reading of questions may be used in the resource room:

- The student, writing in the resource room, can discuss the meaning of the words used in the question with the resource teacher.
- The whole exam can be put on tape in the resource room and the student, using headphones, can both read and listen to the exam at the same time, thus permitting a double-check on the words used. This has proven to be a very successful method, enabling the student to work at his or her own pace and with great confidence.

If, as is the usual practice, only a small percentage of marks is assigned for spelling and writing skills, the student with spelling and writing difficulties may not be overly penalized. If a loss of such marks results in a failure for the whole course, however, this situation would warrant special consideration, taking into account the student's overall performance.

Taping is often suggested as a good alternative to writing an exam for the learning-disabled student, but most students prefer to take their chances and write the exam. *Taping is only a useful medium if the student has been taught how to develop the necessary organizational strategies;* then it can be used very successfully. Of course, whenever possible, oral exams or tests given privately

Difficulties	Strategies
<p>2. Writing (cont'd.)</p> <p>C. <i>Note taking.</i> Many students with learning disabilities have difficulty in taking notes. Since note taking is a basic secondary expectation, their difficulty in this area is a very real burden.</p>	<p>by the subject teacher are very beneficial, and such a method is highly commended. These are not as easy to mark as written papers, which can be checked and rechecked, if necessary. However, if a marking plan has been organized, oral exams are very feasible.</p>
	<p>The classroom teacher should arrange for another student to be a regular note taker for the student who is poor in this area. The note taker can use pressure-sensitive paper or carbon paper to make the copy. This will enable a duplicate set of notes to be made available immediately and with a minimum of fuss, in class, to the poor copier. It will also enable such students to participate in the classwork that might follow and from which they would otherwise be left out, as they would be laboriously copying, sometimes word by word, long after everyone else.</p> <p>Levels 2 and 3 of the NASSP Study Skills program have excellent units on teaching different note-taking skills. Level 2 covers outlining and mapping, and level 3 presents diagramming and summarizing.</p>

An Integrated Approach to Teaching Written-Language Skills

The following research-essay and story-writing processes can be helpful for reluctant writers. The steps were developed using task analysis and are based on the use of classification and sequencing skills. The principles of mastery learning are followed to ensure that students have many opportunities for overlearning. Thus, objectives continually overlap while escalating in difficulty. At each lesson stage it is helpful to predict which students will encounter what types of difficulties so that attention and assistance can be quickly and effectively provided by the teacher, the resource person, a peer, or a paraprofessional. Not all steps will be necessary for all students.

The research-essay process

Many students experience difficulty with their written and organizational skills. Given an easy organizational format, students can more readily express themselves in writing. By writing, the often segregated skills of spelling, dictionary work, and sentence structuring are seen as a meaningful part of a final product.

In the following process emphasis is placed on teaching students first how to put information into point form and then how to state the information in their own words in sentence form. This process must not be a simple regurgitation of copied paragraphs, and the information the students obtain must be considered secondary to developing the students' understanding of the process of writing. Teachers can help students develop this understanding in eight lessons as follows:

Lesson 1: The students are given a general overview of how to make a tree diagram and to list in point form.

1. Have a student read aloud, slowly and clearly, a short selection.
2. Ask the class what overall topic is being discussed. This provides the chart headings.

Headings

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3. Ask the class what general areas are being discussed, that is, some of the things that are being talked about. This provides the sub-topics. To ensure the finding of all subtitles and to train students to look sequentially, ask questions like: "What is paragraph 1 talking about?" "Is paragraph 2 talking about the same thing? If not, what is it talking about?"

4. Have a student read paragraph 1. Ask the class to state the information presented and to indicate in point form the subtopic under which it can be classified. Discuss good and bad methods of listing in point form.

Lesson 2: The students classify or "file" information under given subheadings.

1. Have students cut out the heading and sub-headings and paste them at the top of a large sheet of newsprint. You can have them leave space for two more subheadings of their own creation if they require them.

Heading

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Subheading Subheading Subheading

2. Have students cut out each "point" and glue it under the most appropriate subheading. Some points can go under more than one subheading. Make the students decide.
3. Stress neatness and spacing in order to emphasize their importance in reinforcing classification skills.

Lesson 3: The students create the subtopic headings for the given information.

1. Have students create their own classification key appropriate to the information given. This will likely be similar to the headings that have already been used in previous assignments.
2. Have students classify each point by using symbols or numbers beside each to indicate the subheading under which it should be placed.
3. Ask students to title the sheet.
4. Remove their work and hand out copies of the story. Have students read it after being instructed to pay close attention to how easily the information is absorbed. Reading may be oral if the students are at a low reading level or silent if they are independent readers. Collect the copies and ask the students questions based on the story.

Lesson 4: *The students create a tree diagram and list the information in point form. They become aware of the fact that information from more than one source can be added under the subheadings already devised.*

1. Have students classify all of the useful and interesting information they can find from a story under their own headings.
2. Have students take a second story on the same topic and classify the information given.

Note: Two stories may be used, or any combination of the following: story, newspaper article, filmstrip, movie, interview, and so on.

Lesson 5: *The students learn how to sequence the second story.*

1. Once the information has been "filed" from all sources, have students examine the subheadings and sequence them.
2. Have students number the points under the subheadings according to the order in which they would appear. Students should also consider possible combinations of points.

Lesson 6: *The students write an essay using paragraph introductions and concluding sentences.*

1. Have students help you to create a point-form list or an outline for a selection on the chalkboard.
2. Demonstrate that, in order to communicate clearly, a writer must:
 - tell what he or she is going to talk about (topic sentence);
 - talk about it (ideas and facts);
 - tell, in a generalized statement, what he or she has talked about (concluding sentence).
3. Using the above "sandwich" technique, start the essay on the board with the students' help. Encourage them to provide as many ideas for an opening sentence as possible.
4. Sequence all subheadings and number each point.
5. Point out that each new subtopic forms a new paragraph and continue to sandwich the paragraphs until the technique is clearly understood.
6. Invite as many examples as possible of a good closing sentence for the whole essay.

Lesson 7: *The students create a "mini-essay".*

1. Have students choose their own topic from the material you have provided, based on their interest.
2. Have students create a tree diagram and a point-form list for the material.
3. Ask students to hand back the source material.
4. Have students sequence the subheadings and the points under each subheading.
5. Ask students to write a "mini-essay" using the sandwich technique.

Lesson 8: *The students write a major research essay with the aid of the tree diagram.*

In completing a research essay successfully, a student learns how to:

- extract information that he or she considers important from many sources of information;
- list details in point form efficiently so that notes are as short as possible;
- turn notes into paragraphs that flow into one another in a logical sequence.

Finally, the information taken from books and other sources becomes the student's information and can be more easily understood and remembered since he or she is (a) valuing it, (b) classifying it, and (c) sequencing it to suit his or her own purposes.

The story-writing process

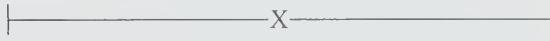
This process can be utilized with students from the Primary to the Senior Division. Some components appeal to young children, since cutting and pasting, colouring, and storytelling are involved. Teachers can use the following lesson structure:

Lesson 1: *The students review point form.*

1. Read a story to students.
2. Have students identify the most exciting part of the story.
3. Write that part under the title *Problem* in point form on the chalkboard.
4. Ask students what happened before this part. Write the points under *Introduction* on the chalkboard.
5. Continue as above, but ask them to respond in point form. Encourage as many responses as possible. Record appropriate responses on the chalkboard.

- Continue asking for points. Have one student recount an incident from the story and a second student correct the thought into a point for a list. Record appropriate responses on the chalkboard.
- Ask students how the story ends. Introduce the term *resolution* on the chalkboard.

Introduction Problem Resolution



Lesson 2: *The students sequence pictures.*

- Hand out a sequence of three pictures in the wrong order.
- Have students put them in the proper order.
- Discuss what was done.
- Have students write an appropriate sentence beneath each picture.
- Write one set of statements on the board as a class activity, using "spiced-up" descriptive sentences.

Lesson 3: *Same as Lesson 2.*

- Hand out three more sheets of three pictures each.
- Have students write a sentence under each after sequencing them.
- Ask students to select their favourite sequence.
- Have them cut and paste this sequence on a large sheet.
- Ask them to rewrite their sentences by "spicing them up".

Lesson 4: *The students list the details of a story in point form under the headings Introduction, Problem, and Resolution.*

- Show a picture to the class.
- Ask students to identify the central *problem* in the picture.
- Have them state it in point form and write it on the board for the class.
- Ask them for a possible *resolution*. Break it into steps and ask for point-form responses for the board.

Lesson 5: *The students create an introduction that will lead up to the problem.*

- Show four unrelated pictures.
- Read an introduction for each of the pictures and have students number them.
- Have students identify the problem and create the resolution for any one of the pictures.

Lesson 6: *Students sequence and identify the rising action and resolution.*

- Read a short book (e.g., *The Shrinking of Tree-horn*) with the class.
- Hand out a ditto of the events (unsequenced) and a ditto of "railway stations" (blank).



- Discuss the *problem*.
- Have students cut it out and glue it in.
- Discuss what happened first, and have students cut it out and glue it on the first station.
- Explain that all the facts between what happened first and the problem are the rising action and have the students cut them out and glue them in on their own.
- Discuss the fact that all of the stations after the problem are the resolution, and have them glue the remaining parts on these stations.

Lesson 7: *Students are able to sequence the rising action and create a resolution.*

- Students read a story and stop at the problem.
- Hand out a ditto of the events leading up to the problem.
- Have students sequence and glue as indicated in Lesson 6.
- Ask students to write a resolution in the remaining stations.

Lesson 8: *As a group, the students define the problem implied in a picture provided by the teacher.*

1. Show the students one picture. As a group, define the problem.
2. Students record the problem at the appropriate station. Put it on the board.
3. Discuss as a group several possible starting points and record these in point form on the board.
4. Students choose and record an introduction for their story and sequence the story on a chart up to the problem.
5. Students sequence the resolution.
6. Students work in pairs on one student's plot line to add any additional details. They then work on the other student's plot line to add any further details.

Lesson 9: *Students repeat all of the above for extra practice (if needed).*

Lesson 10: *Students expand point-form statements into complex descriptive sentences.*

1. Post some examples of point-form sentences in sequence (these form a story).
2. Have students assist you in "spicing up" these points. Use an overhead projector and acetate. Use words crossed out and added so students can see what rough work looks like. Advise them that the "scribbles" are useful. Discuss synonyms, adjectives, and adverbs.
3. Take the rough copy and retype it. Hand out copies of the finished draft and the rough draft for students to read and compare (and enjoy).

Lesson 11: *Students attempt a rough draft of their last plot line.*

Lesson 12: *Volunteers type good copies of the story or put it on a word processor.*

Lesson 13: *Students break the story up into sections for illustrating.*

Lesson 14: *Students may choose to have their stories "published" and placed in the library.*

When their work is published, young people become aware of a broader audience than their teachers or parents. This motivates them to produce work that is as entertaining and informative as possible. They try to communicate as clearly and as neatly as they can. They become more aware of the use of illustrations, the need for sections, parts, or paragraphs, and the need for a resolution or conclusion that is directly related to the introduction.

The publication stage can be set up to include students who would derive benefit from being involved in this focused group activity. Many students will continue to write for the express purpose of being published. Their greatest reward is often to look in the back of their book at the names of the students who have read their work.

Postsecondary Education Opportunities

A few years ago formal education for many students with learning disabilities ended at high school. Today, more of them are pursuing further education at postsecondary institutions. The following concerns should be addressed when considering a choice of programs at one of these institutions:

- Are efforts made to accommodate students who have different learning characteristics?
- Are students permitted to record lessons on tape?
- May essays be submitted on tape?
- May exam questions be put on tape?
- Are students permitted to answer exams on tape?
- May students take exams in an untimed setting?
- May students have extended time for assignments?
- May students have extended time for course completion?
- May students have a complete oral examination with their responses?
- May students complete part of their examination orally?
- Are tape recordings of textbooks and resource books available?
- If a student has a "spelling disability", would allowances be made for this?

While each postsecondary institution should be considered individually, the extent to which students' needs are met depends not only on the college or university, but also on the department or faculty and the individual instructor.

All colleges and universities recommend that, if a student has a specific learning disability, contact should be made early in the form of either a letter appended to the application form or a personal phone call or visit. The student can then be advised as to what specific modifications can be made. This feedback could well determine which college or university the student will attend.

Guidance personnel in the secondary schools should be aware that many colleges and universities now have a person on staff who acts as an advocate for exceptional students. Guidance departments should develop, and have available, an up-to-date list of these contact persons in order to assist learning-disabled students in making their placement decisions.

For information on special services for learning-disabled students, contact the following:

Universities

The Assistant Registrar

Brock University

St. Catharines, Ontario L2S 3A1

Telephone (416) 688-5550

Co-ordinator, Program for the Disabled

Health Services

Carleton University

Ottawa, Ontario K1S 5B6

Telephone (613) 564-3657

Counselling and Student Resource Centre

University Centre, Level 3

University of Guelph

Guelph, Ontario N1G 2W1

Telephone (519) 824-4120, *Ext.* 3244

Director of Student Services

Lakehead University

Thunder Bay, Ontario P7B 5E1

Telephone (807) 345-2121, *Ext.* 206

Co-ordinator of Student Services

Laurentian University

Sudbury, Ontario P3E 2C6

Telephone (705) 678-1151, *Ext.* 3205

Calendar and Scheduling Officer

McMaster University

Hamilton, Ontario L8S 4L8

Telephone (416) 525-9140, *Ext.* 4339

Information Officer
Nipissing University College
P.O. Box 5002
Gormanville Road
North Bay, Ontario P1B 8L7
Telephone (705) 474-3450, *Ext.* 2327

Office of the Registrar
Ontario College of Art
100 McCaul Street
Toronto, Ontario M5T 1W1
Telephone (416) 977-5311

Assistant to the Director-General of
Student Services
University of Ottawa
University Centre
85 Hasteys
Ottawa, Ontario K1N 6N5
Telephone (613) 564-5053

Gail Glode
Assistant to the Dean of Women
Victoria Hall
Queen's University
Kingston, Ontario K7L 3N6
Telephone (613) 547-6178

Director of Student Services
Ryerson Polytechnical Institute
350 Victoria Street
Toronto, Ontario M5B 2K3
Telephone (416) 979-5187

Co-ordinator of Services to Disabled Persons
Koffler Student Services Centre
University of Toronto
Toronto, Ontario M5S 1A1
Telephone (416) 978-3011, 978-3337 (TDD)

Director of Student Services
Trent University
Peterborough, Ontario K9J 7B8
Telephone (705) 748-1215

Co-ordinator of Services for Disabled Persons
Needles Hall
University of Waterloo
Waterloo, Ontario N2L 3G1
Telephone (519) 885-1211, *Ext.* 2993
TTY/TOO (519) 886-6250 (non-voice)

Counsellor for Disabled Students
The University of Western Ontario
London, Ontario N6A 3K7
Telephone (519) 679-2409

Office of the Dean of Students
Wilfrid Laurier University
Waterloo, Ontario N2L 3C5
Telephone (519) 884-1970, *Ext.* 2319

Assistant Dean of Students
University of Windsor
Windsor, Ontario N9B 3P4
Telephone (519) 253-4232, Ext. 3288

Learning Disabilities Program
Dr. Marc Wilchesky, Co-ordinator
Room 112, Behavioural Sciences Building
York University
4700 Keele Street
North York, Ontario M8J 1P3
Telephone (416) 736-5140

The Centre for Handicapped Students
Room 101E, Behavioural Sciences Building
York University
4700 Keele Street
North York, Ontario M3J 1P3
Telephone (416) 736-5140

Colleges

Director of Admissions
Algonquin College
1385 Woodroffe Avenue
Nepean, Ontario K2G 1V8
Telephone (613) 725-7517

Manager of Admissions
Cambrian College
1400 Barrydowne Road
Sudbury, Ontario P3A 3V8
Telephone (705) 566-8101

Dean, Student Services
Canadore College
P.O. Box 5001
North Bay, Ontario P1B 8K9
Telephone (705) 474-7600, Ext. 2199

Director of Counselling Services
Centennial College
P.O. Box 631, Station A
Scarborough, Ontario M1K 5E9
Telephone (416) 694-3241, Ext. 273

Associate Director, Central Student Services
Conestoga College
299 Doon Valley Drive
Kitchener, Ontario N2G 4M4
Telephone (519) 653-2511, Ext. 258/291

Associate Registrar, Postsecondary Programs
Confederation College
P.O. Box 398
Thunder Bay, Ontario P7C 4W1
Telephone (807) 475-6110
*Northwestern Ontario residents can call toll-free:
1-800-465-6961 or 465-6962*

Registrar and Director of Student Affairs
Durham College
Simcoe Street North
Oshawa, Ontario L1H 7L7
Telephone (416) 576-0210, Ext. 254

Manager, Student Services
Fanshawe College
P.O. Box 4005
London, Ontario N5W 5H1
Telephone (519) 452-4282

Student Services
George Brown College
P.O. Box 1015, Station B
Toronto, Ontario M5T 2T9
Telephone (416) 967-1212, Ext. 2321

Director, Student and Community Services
Georgian College
One Georgian Drive
Barrie, Ontario L4M 3X9
Telephone (705) 728-1951

Associate Registrar
Humber College
3999 Lakeshore Boulevard West
Rexdale, Ontario M8V 1K8
Telephone (416) 252-5571

Registrar
Lambton College
P.O. Box 969
Sarnia, Ontario N7T 7K4
Telephone (519) 542-7751, Ext. 295

Counselling Office
Loyalist College
P.O. Box 4200
Belleville, Ontario K8N 5B9
Telephone (613) 962-9501, Ext. 204

Registrar
Mohawk College
P.O. Box 2034
Hamilton, Ontario L8N 3T2
Telephone (416) 575-2113
or Co-ordinator, Disabled Student Services
Telephone (416) 575-2501

Counselling Services
Niagara College
Woodlawn Road, P.O. Box 1005
Welland, Ontario L3B 5S2
Telephone (416) 735-2211, Ext. 780

Publicity and Planning Officer
Northern College
Highway 101, P.O. Box 2002
South Porcupine, Ontario P0N 1H0
Telephone (705) 235-3211, Ext. 134

Director of Student Services
St. Clair College
2000 Talbot Road West
Windsor, Ontario N9A 6S4
Telephone (519) 966-1656, *Ext.* 220

Exceptional Student Project
St. Lawrence College Saint-Laurent
2288 Parkedale Avenue
Brockville, Ontario K6V 5X3
Telephone (613) 345-0660

Registrar's Office
Sault College
P.O. Box 60
Sault Ste. Marie, Ontario P6A 5L3
Telephone (705) 949-2050, *Ext.* 215

Registrar
Seneca College
1750 Finch Avenue East
North York, Ontario M2J 2X5
Telephone (416) 491-5050

Registrar
Sheridan College
Trafalgar Road
Oakville, Ontario L6H 2L1
Telephone (416) 845-9430

Admissions Office
Sir Sandford Fleming
School of Natural Resources
Frost Campus, Box 8000
Lindsay, Ontario K9V 5E6
Telephone (705) 324-9144

Admissions Office
Sir Sandford Fleming College
Sutherland Campus
526 McDonnel Street
Peterborough, Ontario K9J 7B1
Telephone (705) 743-5620

Source: Ministry of Colleges and Universities,
Ontario, *Horizons 1987-88: A Guide to
Postsecondary Education in Ontario*.

Additional Resources

1. Selected Professional Periodicals

Academic Therapy. 20 Commercial Boulevard, Novato, California 94947-6191.

The Arithmetic Teacher. Publication of the National Council of Teachers of Mathematics, 1906 Association Drive, Reston, Virginia 22091.

The Computing Teacher. (A monthly journal containing many excellent articles on computers and their application in a school setting.) International Council for Computers in Education, University of Oregon, 1787 Agate St., Eugene, Oregon 97403-1923.

Elementary English. Publication of the National Council of Teachers of English, 1111 Kenyon Road, Urbana, Illinois 61801.

Exceptional Children. Publication of the Council for Exceptional Children, 1920 Association Drive, Reston, Virginia 22091-1582.

Journal of Learning Disabilities. The Professional Press, Inc., 5615 West Cermak Road, Cicero, Illinois 60650.

The Journal of Special Education. Buttonwood Farms, Inc., Neshaminy Plaza II, Suite 101, Bristol Pike and Street Road, Bensalem, Pennsylvania 19020.

Learning: The Magazine for Creative Teaching. Education Today Company Inc., 1111 Bethlehem Pike, Springhouse, Pennsylvania 19477.

Learning Disability Quarterly. Publication of the Council for Learning Disabilities, Department of Special Education, University of Kansas Medical Center, Kansas City, Kansas 66103.

The Reading Teacher. Publication of the International Reading Association, 800 Barksdale Road, P.O. Box 8139, Newark, Delaware 19714-8139.

Special Education in Canada. Publication of the Canadian Council for Exceptional Children, Publication Services, 4-116 Education North, Faculty of Education, University of Alberta T6G 2G5.

Teaching Exceptional Children. Publication of the Council for Exceptional Children, 1920 Association Drive, Reston, Virginia 22091-1589.

2. Multimedia Resources

Videotapes

A Different Understanding series. TVOntario.

This is a series of five videotapes dealing with children with special needs. The series is accompanied by print material for teachers and parents.

The Invisible Handicap. BPN 164102. Colour, 29 min. Expiry date: April 23, 1989.

This videotape looks at the questions that experts and researchers in the field are struggling with.

I Was a Kid Who Couldn't and Now I Can. BPN 164104. Colour, 29 min. Expiry date: January 16, 1988.

This videotape deals with the importance of imagination in developing programs for children with special needs.

A Question of Codes. BPN 164103. Colour, 29 min. Expiry date: January 16, 1988.

Deals with the identification and assessment of learning disabilities today – and future possibilities in the field.

Tag Along. BPN 164105. Colour, 29 min. Expiry date: June 1, 1987.

The story of a family whose eight-year-old daughter isn't fitting in.

What Do You Do With a Kid Like That? BPN 164101. Colour, 29 min. Expiry date: January 23, 1987.

The drama of Tony, an adolescent with many special needs.

Contact your media centre for details.

The Puzzle Children. The 3M Company, 1977. Colour, 60 min. $\frac{1}{2}$ -inch open reel or $\frac{3}{4}$ -inch cassette.

Julie Andrews and Bill Bixby explain the nature of learning disabilities in a program produced for American television.

Available from:

The 3M Company of Canada Limited
P.O. Box 5757
London, Ontario N6A 4T1
(519) 451-2500

or

The Ontario Association for Children and Adults
With Learning Disabilities (OACALD)
1901 Yonge Street
Toronto, Ontario M4S 2Z3
(416) 487-4107

Sound filmstrips (filmstrip, audiotape, and script)

Everybody Has a Song. California Association for Neurologically Handicapped Children, 1978. 35 mm, colour.

Everybody has a Song, narrated by Henry Winkler, is an audio-visual production designed to help the learning-disabled child understand why he or she is in a special class and how he or she may benefit from it; and to help the learning-disabled child believe that he or she is a valuable person who can look forward to a fulfilling and productive future.

Available from:

"A Song"
P.O. Box 2006
Sacramento, California 90582

A Walk in Another Pair of Shoes. California Association for Neurologically Handicapped Children, 1972. 35 mm, colour, $18\frac{1}{2}$ min.

A Walk in Another Pair of Shoes, narrated by Tennessee Ernie Ford, is an audio-visual production designed to explain to children some of the difficulties encountered by "neurologically handicapped" children. The emphasis is on how it feels to be handicapped and how a normal child can be of assistance to a handicapped friend.

Available from:

California Association for Neurologically
Handicapped Children
P.O. Box 4088
Los Angeles, California 90051

Films

(On development)

Behaviour Equals You. National Film Board, 1972.

16 mm, colour, 14 min.

This animated film deals with the development of behavioural patterns from infancy.

Out of the Mouths of Babes. National Film Board, 1973.

16 mm, colour, 28 min.

This film outlines how children learn to speak.

(On learning disabilities)

Children Without Words. BBC, 1969. 16 mm, colour.

40 min. Distributed by the National Film Board. This film deals with children who have difficulty in comprehending language. Some find written language meaningless. For others, speech has no significance. This film shows classical methods of teaching such children to live in a highly literate society.

Early Recognition of Learning Disabilities. Churchill Films, 1969. 16 mm, colour, 30 min.

Children with learning disabilities stand out clearly in daily classroom activities. This film, which deals with the Primary years, provides a stimulus for discussion.

Why Billy Couldn't Learn. Churchill Films, n.d. 16 mm, colour, 45 min.

This film portrays the assessment, "retraining", and behaviour of children with learning disabilities in the Junior grades.

The latter two films are available through:

National Audiovisual Center

National Archives and Records Services

Washington, D.C. 20409

or

The Ontario Association for Children and Adults With Learning Disabilities (OACALD)

1901 Yonge Street

Toronto, Ontario M4S 2Z3

(416) 487-4107

Notes

1. Parts of these audio-visual materials may be seen as displaying a lack of sensitivity towards developmentally handicapped people.
2. Many of the films available on learning disabilities, including the last two listed, were produced a number of years ago when the field was in its early development. School boards should watch for newer film listings and contact distributors for information on the latest releases.

3. Additional References

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